TECHNOLOGY DEPT

Gas Journal

LIGHT - HEAT - POWER - BY-PRODUCTS

Vol. 246. 97th Year. LONDON, NOVEMBER 7, 1945. No. 4303. Price 1/-

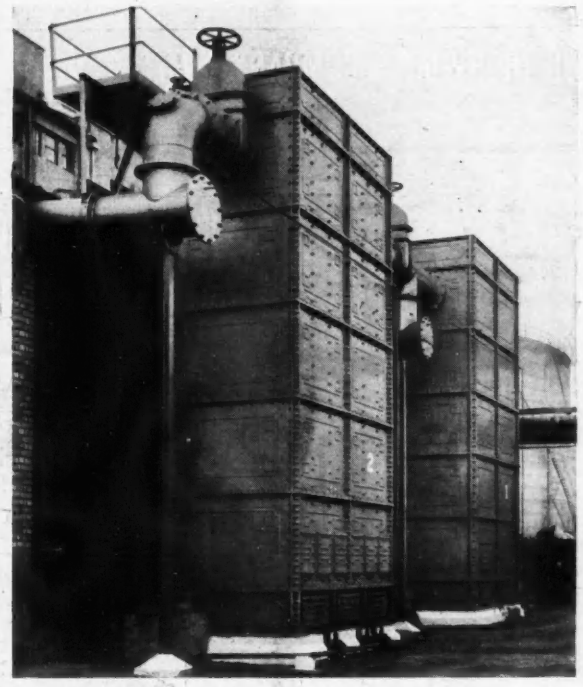
Registered as a Newspaper.

PUBLIC LIBRARY
NOV 26 1945
DETROIT

FOR

CONDENSERS

OF ALL TYPES



This illustration shows a modern R. & J. D. Ltd. Vertical Tube Water-Cooled Condenser of the Multi-pass type. It was installed to deal with 3 million cubic feet of gas per day, and when on test, subsequent to completion of erection, it cooled gas at 154° F. to within 2° F. of the cooling water temperature when using 35 gallons of water per 1000 cu. ft. of gas.

Advantages claimed for our Vertical-tube Multi-pass Condensers are:

(a) Extremely high efficiency.

(b) Low water consumption compared with vertical tube condensers of ordinary design.

(c) Negligible back-pressure.

(d) Easy access, enabling tubes to be cleaned whilst condenser is in operation.

WE SPECIALISE IN THE DESIGN AND MANUFACTURE OF ALL TYPES OF CONDENSERS, COMPLETE IN ALL NECESSARY DETAILS AND EMBODYING THE LATEST PRINCIPLES IN ACCORDANCE WITH MODERN REQUIREMENTS

YOUR ENQUIRIES WILL BE WELCOMED BY

R. & J. DEMPSTER LTD.

HEAD OFFICE & WORKS:
GAS PLANT WORKS, MANCHESTER, 10
PHONE: COLLYHURST 2554-5-6
WIRE: "SCRUBBER, MANCHESTER"

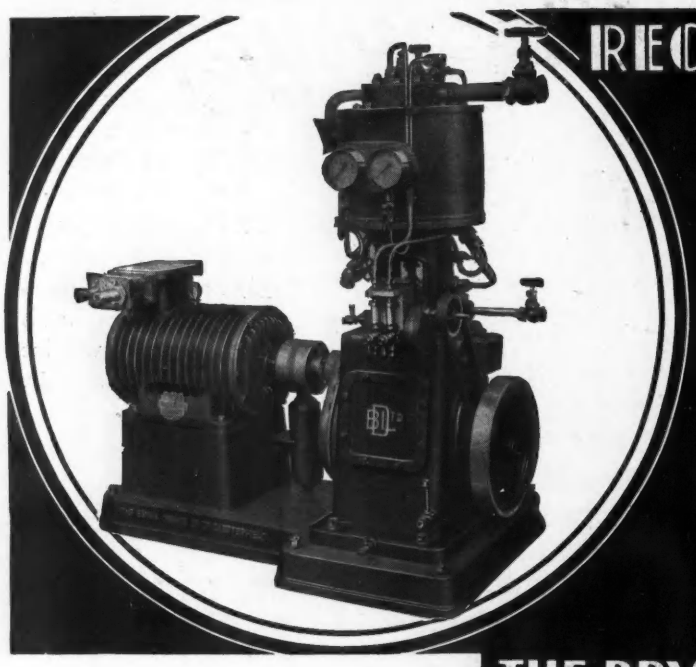
LONDON BRANCH OFFICE: 34 VICTORIA STREET, S.W.1. PHONE: ABBEY 4426. WIRE: "SCRUBBER SOWEST"

For your post war lighting...

STANTON SPUN CONCRETE STANDARDS

The Standard with the unique finish.

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM



RECIPROCATING COMPRESSORS For GAS or AIR

High Speed
Vertical Reciprocating type

Easy Accessibility to Working Parts

Robust Construction
and of the very latest design

Working parts of ample proportions
Perfect Balance

The Compressor illustrated is a Single-Crank Machine fitted with splash lubrication, water cooled cylinder and intercooler and hand unloading device. Capacity —500 cubic feet per hour, against 150 lbs. pressure and running at 400 r.p.m.

THE BRYAN DONKIN CO., LTD.

Engineers and Ironfounders.
Head Office and Works, CHESTERFIELD.
London Office: 3 Victoria St., Westminster S.W.1.

Members of the Society of British Gas Industries

GAS JOURNAL, NOV. 7, 1945
VOL. 246 97th YEAR No. 4303

TO A "LIGHT" JOB

Not such a light job either, when you come to consider it. The long years of black-out and blitzes have taken tremendous toll of public lighting equipment all over the country. Many thousands of gas lamps alone must be manufactured and installed before post-war lighting can shine again with the brilliance we used to know.
You may therefore have to wait a while before your Sugg lamps come along, but we are devoting all our energies and resources to the task of reducing outstanding orders.

SUGG
WESTMINSTER

RANELAGH WORKS, CHAPTER STREET
WESTMINSTER, S.W.1 *VIC 3211*

THE FIRM THAT HAS GROWN UP WITH PUBLIC LIGHTING

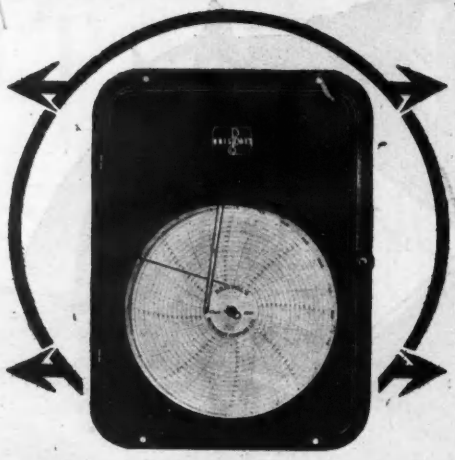
4 POINTS IN FAVOUR OF BRISTOL'S . . . . PRESSURE GAUGES . . . .

CASE DESIGN

Die cast case of generous proportions, moisture and dust proof, of pleasing design—engineered to give ample room and protection to the instrument mechanism.

ELEMENT DESIGN

The length of the pen arm in relation to pen travel is unusually high—resulting in a reduction of stresses in the measuring element, and a clearer chart with a consequent increase in life and accuracy.



SIMPLICITY

Moving parts are reduced to an absolute minimum—in most cases the measuring element is directly connected to the pen arm—the elimination or reduction in linkages gives sustained accuracy throughout the long life of the Bristol pressure gauge.

UNIVERSALITY

Bristol's gauges cover all ranges of pressure and vacuum encountered in industry from 2/10" head of water to 10,000 lbs. per square inch, enabling the user to standardise on Bristol's throughout the plant. Special ranges are available to order.

A9-149

BRISTOL'S INSTRUMENT CO., LTD. PHONE: WILLESDEN 3612-3-4
NORTH CIRCULAR ROAD LONDON N.W.10

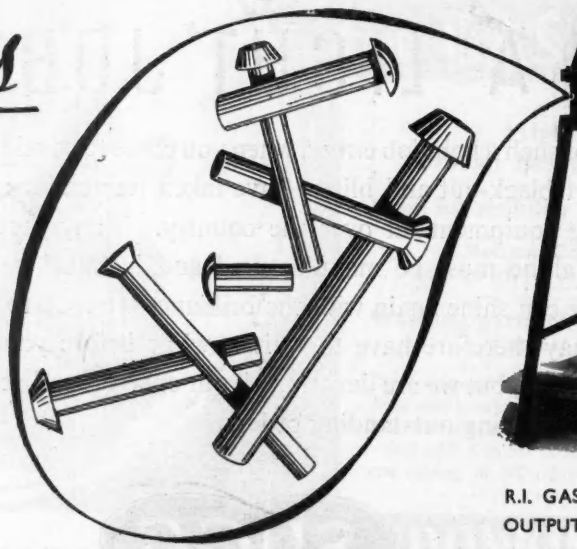
BRISTOLS

Gas Fired Rivet Heating Furnaces

ADVANTAGES:

- ACCESSIBILITY OF RIVETS
- RAPIDITY OF HEATING
- SCALING MINIMISED
- ECONOMY OF FUEL
- CONTROL OF TEMPERATURE
- RIVET WASTAGE MINIMISED

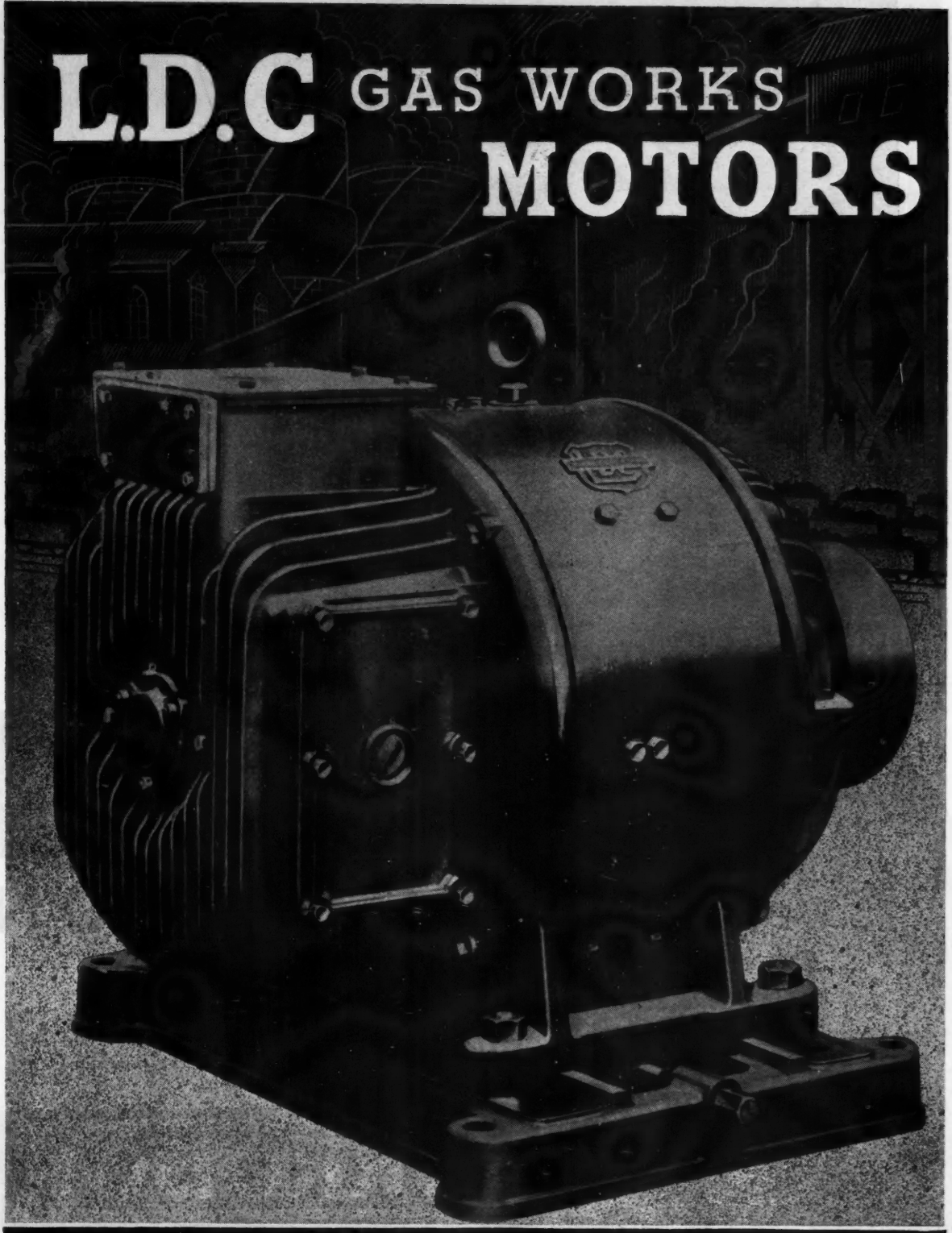
Ask for Bulletin 17



R.I. GAS FIRED RIVET HEATER
OUTPUT 1 CWT. PER HOUR

Consult BRITISH FURNACES LTD CHESTERFIELD

L.D.C GAS WORKS MOTORS



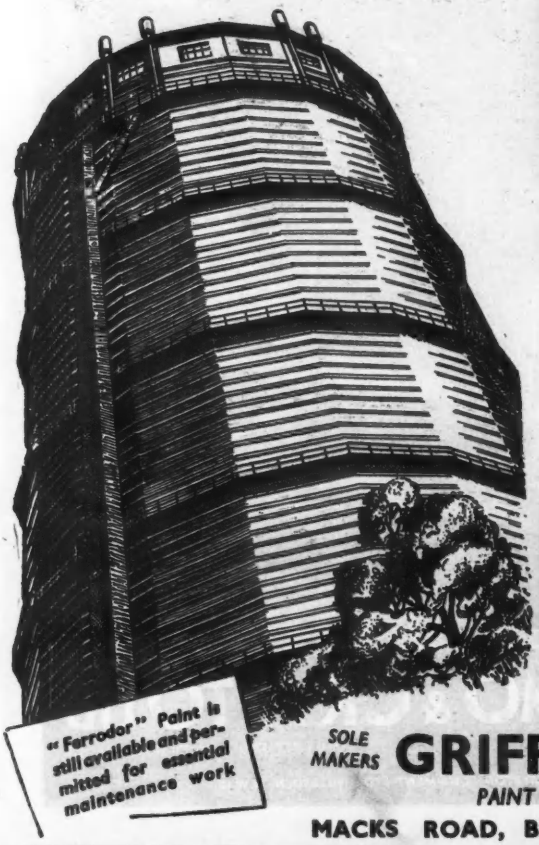
LANCASHIRE DYNAMO & CRYPTO LTD

TRAFFORD PARK, MANCHESTER, 17 WILLESDEN, LONDON, N.W.10

Associated Companies:

FOSTER TRANSFORMERS & SWITCHGEAR LTD., WIMBLEDON, S.W.19 CRYPTON EQUIPMENT LTD., WILLESDEN, N.W.10

FRIEDMAN-ATHILL LTD. 240, HIGH HOLBORN, LONDON, W.C.1 HOLBORN 7107



Give **GASHOLDERS** and other steel structural work the best possible

PROTECTION

Owing to its exceptional rust-inhibiting properties, "Ferrodor" Metal Protection affords great economy in labour and reduces maintenance costs to the minimum

FERRODOR

METAL PROTECTION

"Ferrodor" Paint is still available and permitted for essential maintenance work

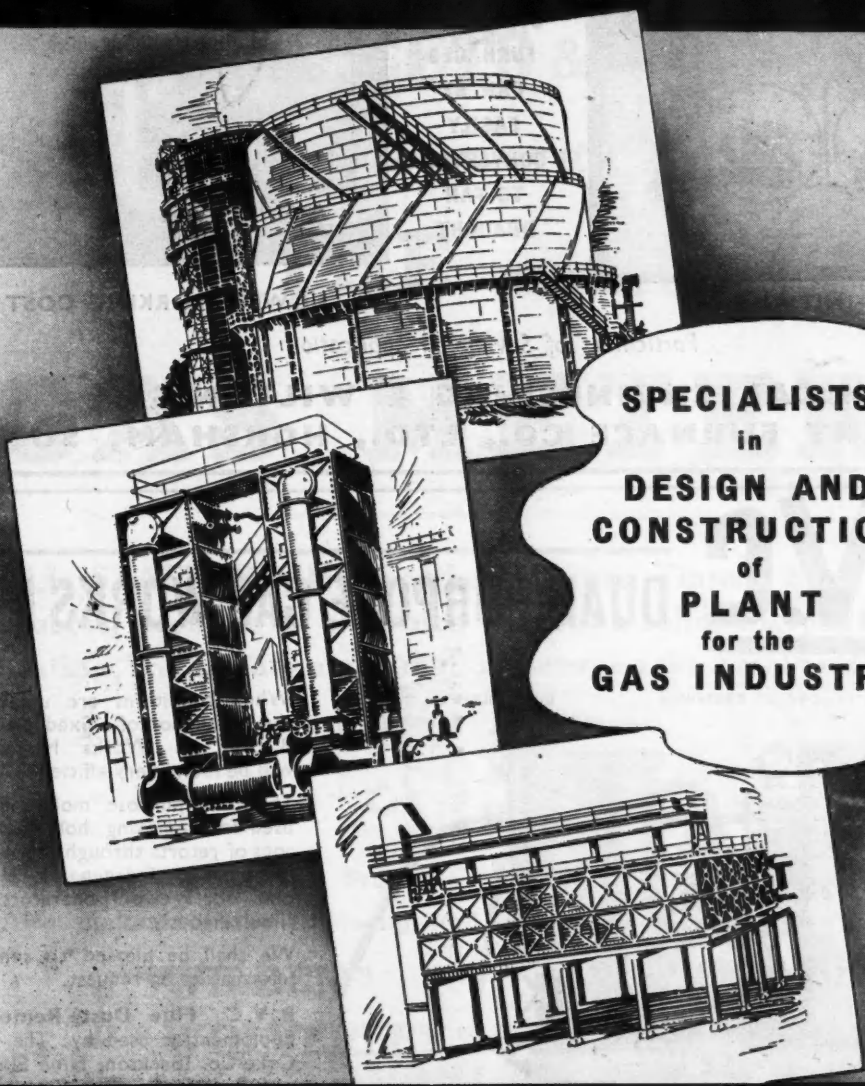
SOLE MAKERS **GRIFFITHS BROS & Co LONDON Ltd**

PAINT ENAMEL AND INSULATING VARNISH SPECIALISTS

MACKS ROAD, BERMONDSEY, LONDON, S.E. 16 Telephone BERmondsey 1151

ABP

GAS WORKS PLANT



SPECIALISTS
in
DESIGN AND
CONSTRUCTION
of
PLANT
for the
GAS INDUSTRY

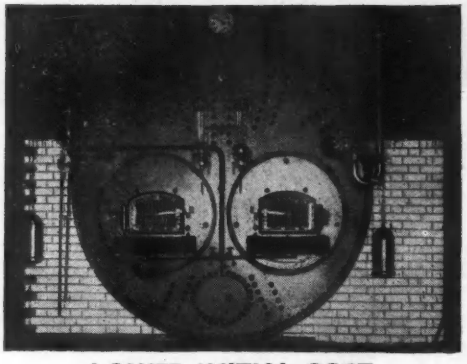
ASHMORE, BENSON, PEASE & CO., LTD.

PARKFIELD WORKS • STOCKTON-ON-TEES

ESTABLISHED 1876

FORCED Wilton DRAUGHT FURNACES

STEAM JET



AIR FAN

EXISTING STEAM JET FURNACES CAN BE EASILY CONVERTED TO FAN DRAUGHT

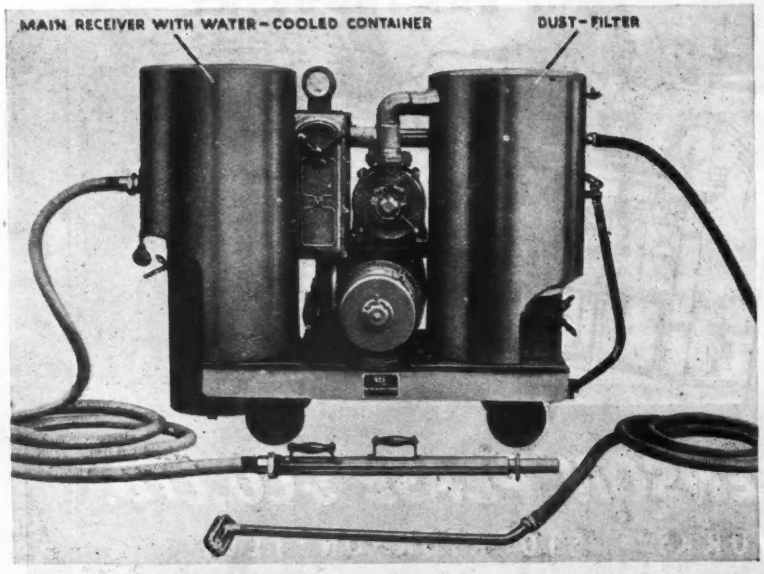
LOWER INITIAL COST

LOWER WORKING COST

Particulars of Saving on application

THE CHEMICAL ENGINEERING & WILTON'S PATENT FURNACE CO., LTD., HORSHAM, SUSSEX

THE B.V.C DUAL-PURPOSE GAS WORKS MODEL



When conditions are unfavourable to the installation of a fixed plant, the new B.V.C. Gas Works Model, Portable will be found very efficient.

This dual purpose mobile unit can be used for removing hot dust from the tops of retorts through the water-cooled container, or for general cleaning, with one or two operators working simultaneously.

We shall be pleased to send you full information on request.

B.V.C. Flue Dust Removal Plant Equipment is used by: The Gaslight & Coke Co. (Beckton, Nine Elms, Southall and Brentford). The Birmingham Corporation Gas Co. The Cardiff Gas Co. The Birkenhead Gas Department. The Commercial Gas Co. The Reading Gas Co., etc., etc.

All enquiries to Dept. GJ/2.

THE BRITISH VACUUM CLEANER & ENGINEERING CO. LTD. GOBLIN WORKS, LEATHERHEAD SURREY. PHONE. ASHTEAD 866

Head Office and Works: **LEATHERHEAD, SURREY.** *Telegrams:* **VACUUMISER, PHONE, LEATHERHEAD**

BALDWINS

STAFFORDSHIRE BEST CHARCOAL

TINNED SHEETS & TINPLATES

Heavily Coated with Pure Tin

THE material for GAS METERS

ALL STAFFORDSHIRE PLATES are Tinned by a special process, peculiar to us, which ensures a solid, thoroughly even coating, and a real amalgamation between the Steel and the Tin.

Makers of the famous

COOKLEY K

Known throughout the World as the finest Tinned Sheet produced. Also makers of the following well-known Brands:

"WILDEN" "ARLEY"

"WOLVERLEY" "UNICORN"

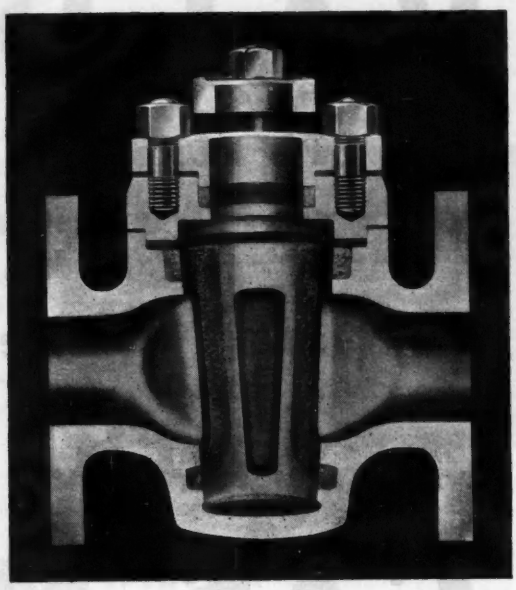
RICHARD THOMAS & BALDWINS LIMITED

WILDEN IRONWORKS, STOURPORT-ON-SEVERN, WORCS.

NOTABLE DEVELOPMENTS IN ENGINEERING HISTORY, 5

1875

ASBESTOS PACKED COCK



The typical construction of an Asbestos Packed Cock is shown in the sectional illustration above; the plug has been removed to show the system of grooves in which the indurated asbestos packing is caulked.

SINCE 1844 the energies of the Dewrance organization have been directed to satisfying the requirements of steam users, and recent announcements have indicated some of our early achievements.

This enterprising spirit has also prompted many other inventions and innovations now commonplace to steam users. The Asbestos Packed Cock is an example, the method employed to form a seal against fluid pressure was an entirely new departure from orthodox practice, when we introduced it in 1875.

We were also the first to supply valves with renewable seats; first to develop in this country the glass toughening process; first to supply Water Gauges with Automatic Valves in both arms, as well as the originators of many other improvements in the construction of boiler mountings.

We were again first in utilizing solid steel forgings for a wide range of steam fittings, a feature in production that avoids the defects inherent in steel castings. The valves and seats are made of "DEWRANCALLOY," a special heat resisting non-corrodible alloy which we developed for important internal components of steam fittings.

In recent years our Patent Bi-colour Illuminated Water Level Indicator has been successfully introduced. By the application of a simple and direct optical principle the steam and water spaces in the Indicator are clearly shown in red and green respectively; no matter how rapidly the water may rise or fall in the sight glass, the contrasting colours change instantly with every fluctuation of the levels and enable the observer to take an exact and instantaneous reading.

If this brief record should be merely historical, it at least reflects the foresight and alertness of the Dewrance organization and establishes our claim to be foremost in the field in the production of high-grade boiler mountings and steam fittings.

Particulars of our latest products will be given in future announcements.

DEWRANCE

Established 1844 *& Co. Ltd.*

PIONEERS & SPECIALISTS IN PATENT VALVES & BOILER MOUNTINGS

GREAT DOVER STREET, LONDON, S.E. 1. TELEPHONE: HOP 1244 (6 LINES)

LEAD

GUARANTEED SOLDERS

SOUND soldering is vital to Gas appliance pipes, fittings, etc., and demands a reliable and guaranteed solder of established suitability for its particular function.

We can offer a range unrivalled in its scope and unsurpassed for all-round efficiency—a natural consequence of the resources at our disposal, i.e., the smelting of Tin Ores in our own Works, scientific refining and blending, and the accumulated knowledge and experience of the many and varied Soldering requirements over many years. Supplied in Tinman's, Plumbers' and Blowpipe qualities, to B.S.S. and to customers' own specifications.

Other Lead Products
Sheets and Pipes, White Lead, Red Lead and Lead/Zinc Paints of all types, Lead Yarn, etc.

ASSOCIATED LEAD MANUFACTURERS LTD
embracing
Locke, Lancaster and W. W. & R. Johnson & Sons Ltd. • Walkers, Parker & Co., Ltd.
The Cookson Lead and Antimony Co., Ltd. • Foster, Blackett & James Ltd.
The Librex Lead Co., Ltd. • The London Lead Oxide Co., Limited.

LIMPSFIELD COURT, OXTED, SURREY • CRESCENT HOUSE, NEWCASTLE-ON-TYNE • LEAD WORKS, CHESTER

ALM

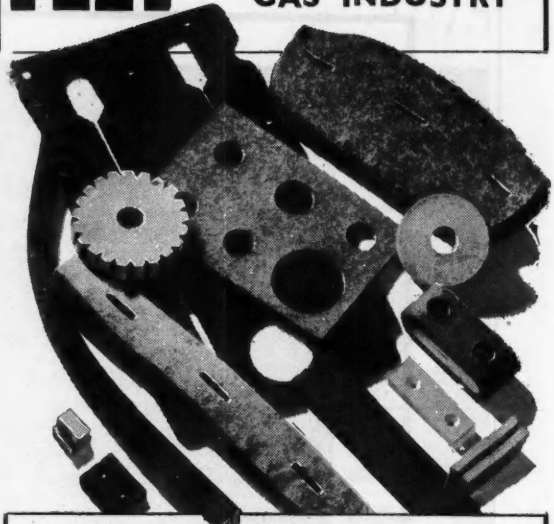
BANK ON 'M & M' METER LOCKS for

As the Bank of England has been a symbol of security throughout the World for generations—so is the 'M & M' Meter Lock the symbol of gas meter security. Meter locks—perhaps 'the needle in the haystack' of gas industry equipment can be the guardian of profits and is therefore worthy of serious consideration. The 'M & M' lock will resist almost any form of violence, will not rust and gives years of faultless service. Lever type, recognised as the safest type, it is a trouble-free lock worth double any cheap imitations – but let us quote you and send sample lock to prove our claim.

H. MITCHELL & CO.
36 & 38 New Charles St.
City Road, E.C.1
Phone: CLErkenwell 3700

M & M PATENT METER LOCKS

FELT FOR THE GAS INDUSTRY



Woollen & Hair Felts, Cloths. Furnishing, Mechanical, Surgical. Washers, Strips and Gaskets. Gas Meter Washers. Felt Cut and Turned. Waterproofing.

STERLING TEXTILE INDUSTRIES LTD
STERLING WORKS, ALEXANDRA ROAD, PONDERS END
MIDDLESEX
'Phone: HOWARD 2214-5, 1755
'Grams: STERTEX, ENFIELD

HIGH PRESSURE GASHOLDER INSTALLATION AT READING.

CLAYTON SON & Co. Ltd., Moor End, Hunslet, LEEDS

Specialists in Applied Asbestos

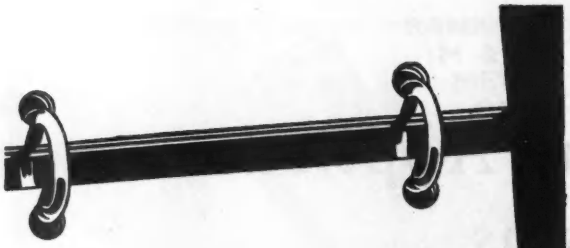
Asbestos, "miracle among minerals," wrought wonders in and for Britain during the years of supreme trial and effort, wrought wonders on the seas, in the air, in North Africa, in Italy, on the beaches of Normandy and in the heart of the enemy's country. The full dramatic story includes giant partitioning curtains for aircraft-carriers, asbestos hose for planes and aerodromes, fire protection and insulation of fighting vehicles and aircraft cabin-heating systems, dyed asbestos cloth canopies for tanker-lifeboats, high-pressure oil jointing for "Fido" packing for gun-mountings, asbestos suits and armour for fire-fighting. The thousand and one problems swiftly solved in engineering works with the aid of asbestos enhanced and expedited British efficiency and prowess. The liberation of Europe was speeded. Having evolved new products in hours of emergency, we are now engaged with all our might, skill and knowledge in making ready to assist the work of reconstruction and rehabilitation everywhere. As scientific specialists in *applied asbestos* we have seventy years' experience to call upon. The outstanding qualities of asbestos, resistance to heat, to acids, alkalis and in particular an amazing flexibility, are of moment to industry.

Ring Bell's for the Service of Asbestos

BELL'S ASBESTOS AND ENGINEERING LIMITED

SLOUGH Tel. No.: SLOUGH 20211 **BUCKS**

24 Branches (including 10 in the Dominions)



BRASS TAPS and UNIONS

The result of 190 years' experience in design and manufacture, Rotherham small parts play a very big part in every branch of engineering to-day. We can meet your requirements, both for standard products including Pumps, Taps and Unions, Greasers, Sight Feed Lubricators, etc., and for special specifications, if required in quantity. May we give you a quotation?

Rotherhams OF COVENTRY

ROTHERHAM & SONS LTD., COVENTRY
Tele.: 4154

PRECISION MANUFACTURERS SINCE 1750

Save Time with Foochow Rapid Infra-Red Finishes

Our famous slogan "THE MOST RAPID OF ALL FINISHES" is now applied to Infra-Red Radiation.

This latest process implies the impinging of heat rays directly upon the paint film and eliminates pre-heating of bulky, heavy objects, resulting in a considerable reduction of time and a tremendous saving in heating costs.

For post-war speed in output of many types of gas appliances we invite you to consult us on this modern method of Rapid Drying.

We claim to have ALWAYS built the Paint to suit the product, and the science of first-class finishes is at your service—free of cost.

Please write us regarding a demonstration at our Laboratories.

Our experts also advise on Plant Layout and Processing. WE CAN HELP YOU.

"Foochow"
RAPID INFRA-RED FINISHES

DONALD MACPHERSON & CO., LTD.
21, ALBION ST., MANCHESTER 1, & MITCHAM, LONDON
Phone: CENTRAL 5441/4 MITCHAM 2963/4

CONTENTS

EDITORIAL NOTES

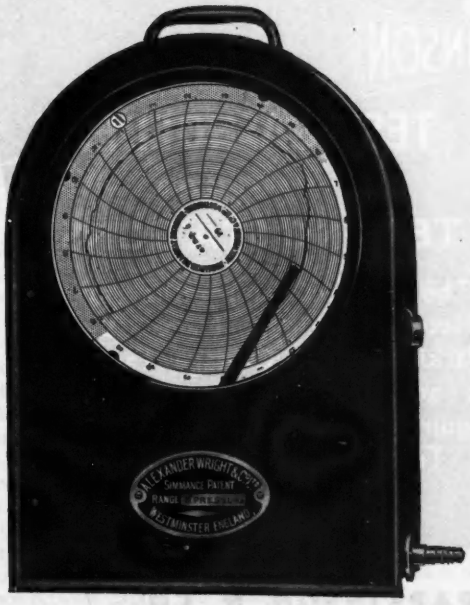
Satisfying Needs 631
Common Interest 631

Personal 632
Obituary 632
Charles Hunt Memorial Medals . . 632
Diary 632
Gas-Heated Cyclone Generators . . 632
Scottish Eastern Juniors 633
Midland Juniors 633
Manchester Juniors 633
Yorkshire Juniors 633
Midland Association 633
Stability of Heated Structures. By L. Muir Wilson (*concluded*) . . 634
Eastern Counties Association . . 635
Town Gas in the Glass Industry. By R. J. Bradshaw 636
Municipal Undertakings' Results . 641
Testing and Design of Flued Gas Fires and Drying Cabinets. By L. W. Andrew, B.A., B.Sc., A.R.I.C. . 642
George Wilson Gas Meters . . 649

Gas Stocks and Shares . . . 650
Gas Products Prices 651

THIS WEEK'S ADVERTISERS

	PAGE
Acme Wringers, Ltd.	S3
Allen, Alfred, & Son, Ltd. ...	S4
Ashmore, Benson, Pease & Co., Ltd.	621
Associated Lead Manufacturers, Ltd.	625
Bale & Church, Ltd.	655
Bell's Asbestos & Engineering, Ltd.	627
Blakeley, Firth, Sons & Co., Ltd. ...	655
Braddock, J. & J.	647
Bristol's Instrument Co., Ltd. ...	618
British Furnaces, Ltd.	618
British Vacuum Cleaner & Engineering Co., Ltd.	622
Bugden, Thos., & Co.	652
Chemical Engineering & Wilton's Patent Furnace Co., Ltd. ...	622
Clayton, Son & Co., Ltd.... ...	626
Cowan, W. & B.	Cover III
Dempster, Robert, & Sons, Ltd.	637, 655
Dempster, R. & J., Ltd.	Cover I
Dewrance & Co., Ltd.	624
Donkin Co., Ltd. (The Bryan)	Cover II
Ewart Chainbelt Co., Ltd. ...	652
Filtrators, Ltd.	653
"Four Oaks" Spraying Machine Co.	Cover IV
Fluxite, Ltd.	655
Friedman-Athill, Ltd.	620
Gas Meter Co., Ltd. ...	Cover IV
Gas Purification and Chemical Co., Ltd.	655
Glover, Thos., & Co., Ltd. ...	630
Goodall, Clayton & Co., Ltd. ...	652
Grant & West, Ltd.	656
Griffiths Bros. & Co. (London), Ltd.	620
Harrisons (London), Ltd.... ...	655
Hilmor, Ltd.	S4
Holmes, W. C., & Co., Ltd. ...	S1
Ingham Clarke, Robt., & Co., and Gay, R., & Co....	S8
International Coin Counting Machine Co., Ltd.	644
Jeavons, E. E., & Co., Ltd. ...	655
Jeavons Engineering Co.	S6
King, Geo. W., Ltd.	S6
King, Walter, Ltd.	652
Lancashire Dynamo & Crypto, Ltd.	619
Macpherson, Donald, & Co., Ltd.	628
Main, R. & A., Ltd.	640
Metropolitan Leather Co., Ltd.	S2
Mewburn, Ellis & Co.	655
Ministry of Fuel and Power ...	S5
Mitchell, H., & Co.	626
Parkinson Stove Co., Ltd. ...	639
Parkinson, W. & Co.	650
Potterton, T. (Heating Engineers), Ltd.	643
Pyrene Co., Ltd.	S7
Reavell & Co., Ltd.	652
Redpath Brown & Co., Ltd. ...	S8
Rotherham & Sons, Ltd.... ...	628
Spencer-Bonecourt, Ltd.	653
Stanton Ironworks, Ltd....	Cover II
Steels Engineering Products, Ltd.	S3
Sterling Textile Industries, Ltd. ...	626
Strachan & Henshaw, Ltd. ...	655
Sugg, Wm., & Co., Ltd.	617
Telegraph Construction & Maintenance Co., Ltd.	652
Thomas, Richard, & Baldwins, Ltd.	623
Trotter, Haines & Corbett, Ltd.	655
Walker, C. & W., Ltd.	644
Wellington Tube Works, Ltd.	Cover IV
West's Gas Improvement Co., Ltd.	648
Widnes Foundry & Engineering Co., Ltd....	654
Wilkes, A. H., & Co.	S4
Willey & Co., Ltd.	S6
Willmott, A. R., & Co.	S4
Wright, Alex., & Co., Ltd. ...	629
Trade Cards	651
Appointments Vacant and Wanted	655, 656
Educational	655
Miscellaneous	655
Patents	655
Plant, &c.	655
Plant, &c., For Sale and Wanted...	655
Repair Work	655



Simmance Patent

"DEAD-BEAT"

PORTABLE RECORDERS

offer Gas Engineers and Distribution Engineers a wide choice of range and pattern . . . three using disc charts and two using drum charts. A hundred and fifty-four different chart ranges are stocked, covering low and high pressures.

Illustrated: **"Saxon"** *Portable DBR.941, enamelled metal case.*

ALEXANDER WRIGHT & CO LTD

1, Westminster Palace Gardens, Victoria Street, WESTMINSTER, S.W.1.

Telephone: ABBey 2207.

Telegrams: Precision, Sowest, London.

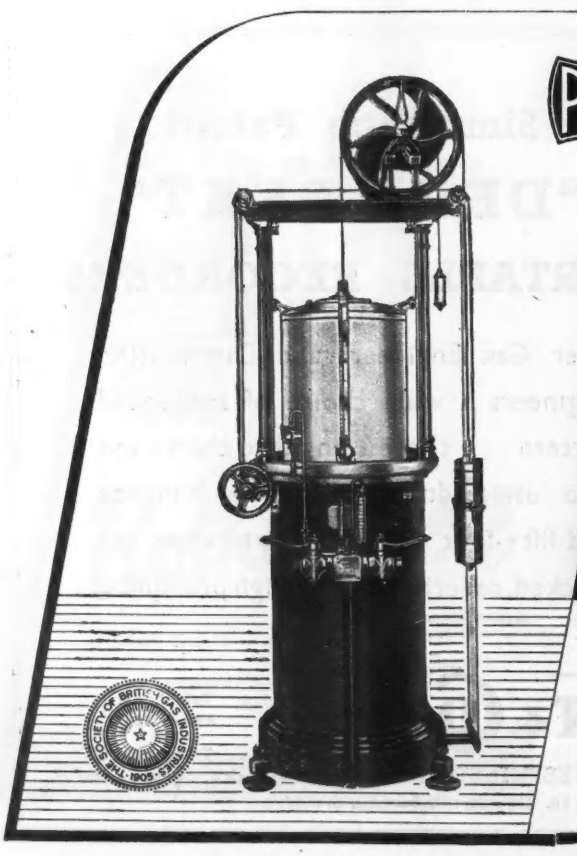
Works address (for Goods and Empties): 28, High Street, Tooting, S.W.17.

A SYMBOL of Good Design

Apart from having a Mechanical Oiling device incorporated, these Meters can be fitted with The TOTTENHAM Maximum Demand Recorder also Alternative Rate Indexes (Day or Night).

Thomas GLOVER & Co. Ltd.

EDMONTON · LONDON N·18 & BRANCHES



PARKINSON

TEST GASHOLDERS

& APPARATUS FOR

TESTING STATIONS

The perfect apparatus for Meter Testing. Made by Parkinsons of Cottage Lane in accordance with all the requirements of the Board of Trade.

W. PARKINSON & CO.
(Incorporated in Parkinson & Cowan (Gas Meters) Ltd.)
Cottage Lane,
City Road, London, E.C.1
also at Birmingham and Belfast

P.2

GAS JOURNAL, NOV. 7, 1945

VOL. 246 97th YEAR No. 4303

EDITORIAL NOTES

SATISFYING NEEDS

IT has been said that the purpose of industry is to provide a reasonable reward to labour and capital. That is but half the story. Experience over some years has made us to believe that when the emphasis is placed upon the rewards of labour, not only does the labour become irksome, but the rewards become singularly illusive. We should rather say that the purpose of industry is to provide for mankind what he needs, not forgetting that his needs must be satisfied under as pleasant conditions as possible, and with due reward to all those engaged in their satisfaction, including capital and labour. The Gas Industry as a public utility exists to meet the public need, and it is entitled to its fair reward for its efforts. The history of the Gas Industry, particularly within the present century, has been one of constant endeavour to supply gas to the consumer more cheaply, of better quality, with the provision of better and more efficient appliances and with a trouble-free service. The reward of capital has been modest. The reward of management has been equally modest, and most feel that it has been over-modest. The reward of labour has been adequate and the conditions of work have been good; this is shown by the rarity of the occasions upon which the Gas Industry has experienced labour difficulties leading to strikes. Co-partnership has given labour a stake in the industry, and the industry as a whole has very much the mellowed atmosphere of the old family business.

That does not mean that all is for the best in the best of all possible worlds. But it shows that problems have been tackled and solved with some success. Many problems are still with us, and they too are being tackled. These thoughts were prompted by Mr. Warwick's Address to the Coke Oven Managers' Association, published in the "JOURNAL" last week. It was a challenging Address, exposing the problems of the industry, and touching on many questions not usually mentioned. Through it the industry may be judged according to our definition of the functions of the industry.

One problem is that of manpower and of human relations from bottom to top. No industry is free from this dragon, nor will be for many years to come. In the coke oven industry the position of labour is good. "The war," said Mr. Warwick, "has taught us the value of experienced and tolerant men. If it had not been for a particular category of loyal worker, serious production stoppages would undoubtedly have occurred as suitable replacement labour was unobtainable." Labour pulled its weight in the war because we were all in the same boat together. Is labour pulling its weight to-day? The docker's strike and many other indications paint a picture less bright than we should like to see. There is a restlessness and a disposition to relax that must be tracked down and exorcized. We are still all in the same boat, and we can neither enjoy the good things of life, nor even keep ourselves alive, unless we put our national affairs on an even keel once more. The answer to that problem is work. And that means that *everyone* must work, and not one section of the population only. A well-known American writer has said: "The real division of opinion is not between capital and labour, between employer and labour union . . . it is between liberal businessmen and liberal labour union men on the one hand and illiberal business men and illiberal labour union men on the other." What is true of America is true everywhere. The forces of progress and of collaboration between man and man, whatever their positions in life, are meeting the forces of reaction. In time labour, management, and capital will come to see that they must make common cause because their cause is common. There may be differing views as between management and labour or as between technical men and their boards of directors upon what is best for the Industry, but if those differences of opinion are honestly discussed, as we believe they must be if the Minister of Fuel and Power is to be adequately advised by the only people who can advise, neither the coking industry nor the Gas Industry need fear for the future.

COMMON INTEREST

THE care taken in the coking industry in regard to the quality of the coke produced is paralleled only by the care taken in the Gas Industry in regard to gas. This is a matter upon which each could learn something from the other. Both recognize the added responsibilities which a policy of smoke abolition will place upon them. Mr. Warwick refers to "an increasingly substantial contribution toward a smokeless country by wider use of the fuel provided by the coking industry"; the Gas Industry faces a similar opportunity, bringing with it important technical problems that can hardly be resolved by each industry separately. We shall require to put to work the maximum carbonizing capacity in the country. We shall require new works that may be based on coke ovens or on gas-works in which to produce the material. Careful consideration should be given in any plan of reorganization to bring the two industries into partnership for the common good, not only of the industries concerned, but of the nation as a whole. A new order is in sight and this demands thought, so that it shall be good. We are about to build anew; let us be sure that the "divinity that shapes our ends" (if we may so refer to the Minister of Fuel and Power) is advised to the best of our ability. One thing is certain, the public will require both coke and gas, and it is an important function of the carbonizing industries to see that those fuels are provided, in sufficient quantities and of the right quality.

That suggests that the same care should be given in both industries to blending coal for carbonization. When the coal industry is nationalized it should be more ready to serve the public by permitting free selection of coal by the consumer. If that is not secured, the thinking public will not be satisfied with nationalization. Our coals must be put to the best possible use, and proper blending for carbonization to produce the right kind of coke and to enable the less good coking coals to be carbonized is an important objective. Mr. Warwick made some suggestions to this end from the colliery aspect, but carbonizing engineers must take a hand in the matter by saying which coals should be blended to produce the best results and by installing the necessary blending plant.

The industries may or may not diverge upon the chemical utilization of gas. The work of the Gas Research Board may yet lead to the Gas Industry producing chemicals from the products of carbonization. The coke oven industry at the moment is more directly interested in this, though little has been achieved in practice. Both industries are engaged in considering education of the younger men. Both have for their primary object the provision of suitable fuel for domestic and industrial use. Maybe consideration will be paid to the implications of Mr. Warwick's suggestion that there should be formed an Institution of Carbonizing Engineers. The difficulties are considerable. The Institution of Gas Engineers is a Chartered Body, and as such can admit only those who are qualified under

its Charter. The outlook of the gas engineer and the coke oven manager, while similar in many respects, is yet markedly different in others. The leopard and the lion are both felines, both have claws, and both purr when stroked (we have not tried this, though we are assurred that it is true), but each has its individual outlook on life. The formation of a new joint body would be unthinkable because of the disturbance entailed in the Chartered Institution. The Coke Oven Managers' Association is small, some say too small to exercise proper weight in the national affairs. The real point at issue is whether more unity would enable the industries better to perform their functions. In our opinion the answer is in the affirmative. The more those engaged in the provision of fuel for public use know of one another's ideas and outlook, the better it is. The Coke Oven Managers' Association, in the 30 years or so during which it has been in existence, has accomplished excellent work. The technical standard of those engaged in the industry has risen in those years in a striking manner. Greater interchange of staff between the gas and coking industries would be to the advantage of both. Joint training schemes, joint pupilage schemes, joint committees, and so forth would no doubt assist materially in this respect. There is something to be accomplished. How to accomplish it is the problem.

Personal

In succession to the late Mr. Thomas Carmichael, the Directors of the Portsmouth and Gosport Gas Company have appointed Mr. WILLIAM K. TATE, M.A., of the Wandsworth and District Gas Company, to the position of General Manager. Mr. Tate is 35 years of age, and was educated at Westminster School and Pembroke College, Cambridge, obtaining an honours degree in the Mechanical Sciences Tripos. He has spent the whole of his working life in the Gas Industry, having served as a pupil, and later Assistant Engineer, with the Gas Light and Coke Company. At present he holds the position of Distribution Engineer, Sales Manager, and Transport Manager to the Wandsworth and District Gas Company, where he has been for the last six years; previously he was Manager of the Sheppey Gas Company. During the war the Wandsworth Gas Company suffered severely from flying bombs. Mr. Tate successfully organized the defence against this attack. Mr. Tate is an associated member of the Institution of Civil Engineers, is keenly interested in the education of employees for the Gas Industry, and has served as Chairman of the Board of Examiners. He has acted as Secretary of the London Regional Engineering Advisory Board since its inception. He will take up his duties with the Portsmouth and Gosport Gas Company on Jan. 1 next.

* * *

Mr. VERNON HEWES has been re-elected an Employee Director of the South Metropolitan Gas Company. Mr. Hewes was first elected an Employee Director in 1930.

* * *

Mr. ROBERT KINSEY, A.M.I.Mech.E., Assistant Engineer and Manager to the Glossop Gas Company, has been appointed to the post of Assistant Gas Engineer to the City of Salford Gas Department.

* * *

Mr. A. J. BANKS has returned to the firm of Winn & Coales, Ltd., as Sales Manager at their London office. Mr. J. W. WINSKILL is now with the firm as Technical Representative covering the North of England and Scotland.

* * *

Mr. W. E. JEWELL, Manager of the Contracts Department of Falk, Stadelmann & Co., Ltd., has completed 50 years' service with the Company. He joined the office staff in 1895; later he was attached to "Contracts" and, during the World War No. 1, took sole control.

Obituary

The death has occurred of Mr. C. H. BUSBY, who was for many years Manager of the Glasgow Branch Office of Ascot Gas Water Heaters, Ltd. Deceased was 40 years of age and was apprenticed at the Gas Light & Coke Company from 1923 to 1930. He subsequently served with the Lowestoft and Batley Gas Undertakings, joining Ascots in 1936.

Charles Hunt Memorial Medals

The Council of the Institution of Gas Engineers has approved the award of the following Medals in the 1945 Diploma Examinations of the Institution:

Charles Hunt Memorial Medal in Gas Engineering (Manufacture) to D. Beavis (Cambridge).

Charles Hunt Memorial Medal in Gas Engineering (Supply) to F. Harvey (Bilston).

Diary

Nov. 8.—Midland Junior Gas Association: Meeting at Birmingham Gas Department. Paper by J. Palser, "The 'C.C.' Burner: Developments in the Application of Town Gas to Industrial Heating Processes."

Nov. 10.—Yorkshire Junior Gas Association: Britannia House, Bradford, 2.30 p.m. Paper, "Two Fuel Industry," by A. Cole.

Nov. 12.—Women's Gas Council: Executive Committee, 12.45 p.m., Gas Industry House.

Nov. 13.—Illuminating Engineering Society: H. C. Weston introduces the new version of the I.E.S. Code. E.L.M.A Lighting Service Bureau, Savoy Hill, London, 6 p.m.

Nov. 12.—Domestic Development Committee: B.G.C., Gas Industry House, 2.15 p.m.

Nov. 13.—National Federation of Gas Coke Associations: General Committee, 10.30 a.m., Gas Industry House.

Nov. 13.—Institution of Chemical Engineers—the Chemical Engineering Group: Joint meeting, Burlington House, 5.30 p.m. Paper, "Some Practical Aspects of Large-scale Gas Distribution, with Particular Reference to Steelworks," by E. Hemingway Jones.

Nov. 14.—B.G.C.: Gas Industry House, 2.15 p.m.

Nov. 20.—Southern Association of Gas Engineers and Managers (Eastern District): Meeting, Gas Industry House, 2.30 p.m. Discussion on Institution of Gas Engineers' Paper, "Technical Aspects of the Gas Industry's Contribution to Post-War Housing."

Nov. 23.—London Juniors: Address by Dr. C. C. Paterson, O.B.E., F.R.S., Gas Industry House, 7 p.m.

Nov. 27–28.—Institution of Gas Engineers: Autumn Research Meeting.

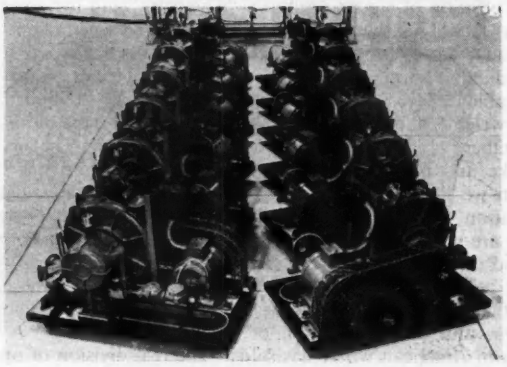
Nov. 27.—Midland Juniors: Visit to the works of the Bryan Donkin Company, Ltd., Chesterfield.

Dec. 6.—Town and Country Planning Association: Lunch-time meeting, 28, King Street, Covent Garden, W.C. 2. Talk and discussion on "Heating the Family Home."

Dec. 7.—North of England Gas Managers' Association (Auxiliary Section), Newcastle, 2.15 p.m.: Address by J. M. A. Mitchell, Newcastle and Gateshead Gas Company.

Gas-Heated Cyclone Generators

An outstanding exhibit at the "Plastics and Aluminium in Building" exhibition referred to in the "JOURNAL" of Oct. 24 (p. 558) was a gas-heated cyclone generator designed in collaboration with the Gas Light and Coke Company for the application of special heat treatment to paint finishes to accelerate drying and hardening. The substantial reduction of drying time to a matter of minutes eliminates production bottlenecks and improves the quality of the resultant finish. The cyclone generator produces a mixture of chemically loaded gases which are directed on to the coated surface by means of flexible hoses. The gases quickly raise the temperature of the coating to a point at which hardening occurs rapidly. The flow of gases assists the removal of solvents from the coating, and leaves a smooth hard surface on which dust has had little time to adhere.



Cyclone Generators.

The cyclone generator can be employed with plastic materials to reduce the period necessary for polymerization of the plastic resin base from several days to a matter of minutes; with air-drying paint finishes, to accelerate evaporation of the solvents; and for the rapid drying of containers and other articles which have been immersed in water, also for removing moisture from damp surfaces, especially metal work, prior to applying a paint finish.

Scottish Eastern Juniors

A meeting of the Scottish Junior Gas Association (Eastern District) was held in Heriot Watt College, Edinburgh, on Oct. 6. Mr. W. Masterton presided, and introduced Mr. J. R. Denoon as President for the 1945–46 Session. Mr. Denoon presented Mr. Masterton with a memento of his year of office.

Mr. Denoon then delivered his Presidential Address entitled "Distribution Digest," an abstract of which was published in the "JOURNAL" of Oct. 31, p. 599.

Midland Juniors

Members of the Midland Junior Gas Association visited the works of the Electric Construction Company, Ltd., at Wolverhampton on Oct. 23. A welcome was given by Mr. W. M. B. Furniss, Manager and Director, and Mr. F. Meir, Works Superintendent. Guides conducted groups round the works to see the manufacture of electrical machinery—motors, dynamos, alternators, &c., static transformers, mercury arc and metal plate rectifiers, and of switch and control gear. The visitors inspected the pattern shop, carpenters' shop, the iron and brass foundries, and the tool shop, all in operation.

Following the tour the party was entertained at tea by the Company.

Mr. K. L. Pearce (President of the Association) proposed a vote of thanks to the Directors and staff, and Mr. W. Macnaughton, Wolverhampton Gas Company, seconded the vote.

Manchester Juniors

A Meeting of the Manchester and District Junior Gas Association was held at the Gas Showrooms, Manchester, on Oct. 20, when the President (Mr. D. Benson) declared the following members elected to the various offices for the session 1945/46:

Junior Vice-President.—E. Bates.
Hon Treasurer.—E. Kenyon.
Hon. Secretary.—F. Johnston.
Council.—F. Bell, R. J. Bradshaw, H. N. Dann, E. B. Field, W. Hodkinson, J. C. Hogg, A. Ormrod, D. M. Thompson.

The retiring President (Mr. D. Benson) thanked the members for the loyal way in which they had supported him. In installing his successor, he thought that he was right in saying that Mr. Cartledge was the first member from Oldham to occupy the office of President. He had served on the Council for the past five years, and in 1939 he was awarded the Bronze Medal of the Institution of Gas Engineers, and also the W. T. Glover Prize for a Paper dealing with the coal-handling plant at the Higginshaw Works.

The Presidential Badge was then given to Mr. Cartledge, who suitably acknowledged the honour. He thanked Mr. Benson for the strenuous work he had put into the Association during the past session. Mr. Cartledge, continuing, said that he had taken over the programme arranged by Mr. Speers, who had not found it possible to assume the office of President now that he had secured an appointment at Middlesbrough. There had been no opportunity of preparing a Presidential Address, owing to the short time available, but he hoped to present one at the next meeting.

Mr. A. F. Oatley, Chairman and Joint Managing Director of Cannon Iron Foundries, Ltd., then gave an Address to the members on "A New Method of Heat Distribution as applied to Domestic Cookers, Hotplates, and Ovens, incorporating Non-aerated Burners and Solid Circular Hotplate."

Yorkshire Juniors

The 40th Annual Meeting of the Yorkshire Junior Gas Association took place on Oct. 6 in Leeds, when Mr. J. R. Firth, of Bradford, was succeeded in the Presidency by Mr. C. A. Newham (Leeds). After the formal business of the meeting a large attendance was addressed by Mr. C. S. Shapley Engineer and General Manager of the Leeds Corporation Gas Department.

Mr. C. A. NEWHAM, Manager of the New Wortley Works of the Leeds Gas Department, on taking over the Presidency from Mr. Firth, congratulated his predecessor on having realized the hope of all in the Association—the end of the world war during his year of office.

Other officers elected were:

Senior Vice-President.—F. H. Nicholls, York.
Junior Vice-President.—W. T. Hird, Sheffield.
Hon. Treasurer.—J. Hargreaves, Bradford.
Hon. Secretary.—G. E. Banks, Sheffield.
Members of Council.—C. J. Dougherty (Harrogate), S. Davies (Sheffield), A. Wilkinson (Huddersfield) for three years, and S. R. Bennett (York), two years.
Representatives on District Gas Education Committee.—H. A. Fells (Sheffield) and D. G. Gunn (Leeds), F. H. Nicholls (York) and W. T. Hird (Sheffield).
Hon. Auditors.—F. Roberts and D. C. Henderson, both of Bradford; *ex-officio* Members of Council, Messrs V. J. J. Siddons (Rawmarsh) and J. R. Firth (Bradford).

The meeting re-confirmed Mr. Norman Hudson, of Mirfield, as representative of Manchester District Association of Gas Engineers on the Yorkshire Junior Association.

MR. SHAPLEY'S ADDRESS.

"As I visualize the Gas Industry," said Mr. Shapley, "it is passing through a queer phase. We hear a great deal about reconstruction and post-war planning. Some reconstruction after the disturbance of a world war is inevitable, but it seems to me that any gas undertaking which wants a lot of post-war planning must have been not very well managed previously, because it is reasonable to suppose that it has had, or should have had, quite a lot of planning without waiting for a war to do it."

In the post-war era which had now come, continued Mr. Shapley, administration and distribution were going to be factors of very great importance to all in the Industry, and he suggested that people in all departments had a vital interest in this factor, whatever might be their own particular sphere of immediate work. "Take things we have noticed in past years," he said. "We have a West Riding gas grid. What does the grid idea portend for members of the Industry? It used to be a case of a lot of gas undertakings, each with its own manager, but under the grid method it becomes a case of one central general manager and a lot of area superintendents. Gas managers, it would appear, were passing out so far as concerned many individual undertakings. If that was the trend of events in the Industry the young men had to consider what was going to be their own future.

"When I refer to distribution, also, I speak of it in the widest sense, including expert salesmanship, and in that I include the capacity to mix with the townspeople. As I look round I see many men very good in knowledge of their own particular job, but I think there is a possibility we may be deficient in this capacity to mix among the town leaders. How far do many of us do that? Do we join their club, see to it that we are present at their functions? You may quite probably reply that salaries in the Industry do not permit you to go so far. To that I reply that it is regrettable if Gas Industry salaries are not on a level to make that possible, because I consider it is a necessity for the welfare of our Industry. I am glad to think we are doing a bit now in the direction of improving the salaries position.

"In administration you have to know the works side, and you ought to seek opportunities to get to know the commercial side also. You younger men have a wonderful future if you wll realize that just being able to make gas is not all that is required. You have to sell it, and to do so in the face of strong competition from other fuels, and we cannot tell what may be coming in the future in other quarters. You have no idea of the worries of a man who holds responsibility, more especially in difficult times like the present, when we have to deal with a big number of Government Ministries and spend many hours on the filling up of a mass of Government forms, or the various tasks a general manager must undertake and the variety of meetings he may have to take a part in. I always feel that a manager must depute a substantial share of such responsibilities to members of his staff."

"I think you assistants ought to make a point of asking your managers whether you may spend a little period of time on the administration side, so that you can get to know something of sides of the Industry with which you would otherwise be quite unfamiliar. Having made yourselves efficient on the works side of gas production and gas appliances. it is essential that you should know something of distribution and salesmanship. You must keep constantly in touch with the local architects, surveyors, builders, and so on—and especially so in these days when housing expansion is in prospect."

In conclusion, Mr. Shapley said he hoped the Yorkshire Junior Gas Association during the coming session would have opportunity of seeing the distribution system in Leeds.

Mr. W. HARTLEY, presenting the Clayton Award to Mr. W. T. Hird (Sheffield) for his Paper "Selling a Temperature"—which had also earned him the S.B.G.I. Silver Medal—regretted that for the third year, owing to restrictions, it was not yet possible to hand over the actual medallion.

Midland Association

Mr. A. B. Britton (Hinckley), President, occupied the chair at the autumn general meeting of the Midland Association of Gas Engineers and Managers at Birmingham on Oct. 25.

The announcement was received with applause that it had been decided to make Mr. P. N. Langford (Coventry) and Mr. A. H. Cranmer (Wolverhampton) honorary members of the Association. Both members are past-Presidents of the Association.

New members were elected as follows: Messrs. A. Allen, Walsall; S. C. Bentley, Oxford; A. G. Cranmer, Willenhall; F. J. Edmonds, Regional Gas Officer; E. A. Goodland, Birmingham; A. Hirst, Chase Town; A. W. Lee, General Manager and Secretary, Birmingham Gas Department.

The President offered congratulations to Mr. Frank Harvey, of Bilston, who had secured as a result of the I.G.E. Diploma examination in gas supply the Charles Hunt Memorial Medal of the Institution.

Mr. L. W. Andrew, as Joint Author, opened a discussion on the Paper given to the Institution of Gas Engineers on "Technical Aspects of the Gas Industry's Contribution to Post-war Housing."

Stability of Heated Structures*

By L. MUIR WILSON
South Metropolitan Gas Company

(*Concluded from p. 610*)

The mid-wall stands on top of the Gothic arch skewback lump and the base blocks of this wall are arranged so as not quite to butt. This supports the apices of the arches while allowing for expansion; the mid-wall is also broken at various places, again to allow for expansion. The cross walls, which are shown broken between the upper retorts, are given clearance from the pier walls, and do not butt up to the underside of the covering arch. The result of all this is that the working entrails of the setting are free to move and expand within the shell, and in such a way that the retort columns stay on their original centre line.

The cross walls should be arranged so that they derive no support from the retorts and should stand up if the retorts were not there. The result of this is that the cross walls bear all the weight, and that the retorts are not subjected to flattening forces from superimposed loads. The cross-walls shown are not quite perfect in this respect, but very nearly so. Soon, I hope, we will have achieved this object.

We have had this type of setting in successful use for over two years. The cross walls do not butt hard against the pier walls or come close up against the underside of the top arch.

Taking the structure as a whole the producers are all on one side and one per setting, and the raft is protected from the heat of the main flue by a ventilation space. The bottom main flue is on the opposite side to the producers; it thus equalizes the below-stage temperatures and so prevents tilting of the structure, which might be as much as 2½ in. Only where the flue passes through the pier walls can it exert lift on superimposed brickwork, and here we originally intended to construct corbelled gaps, but we had to abandon the idea because it would interfere with streamline flow. The outward thrust of the arch is taken on a steel channel carried behind the buckstaves.

The weight of the setting proper is carried on the lowest arch, which is sprung from the pier walls, and an empty space is left between this arch and the top of the main flue. This space is often wondered at, but containing nothing, it cost nothing to construct. The arch is built of three rings of side wedges, but since it is heated evenly throughout there is no special objection to the practice.

The next arch above covers the producer gas flare tunnel, and is free, with its surroundings, to rise with the arch below. The secondary air ducts act as expansion joints for this zone, but the thrust of the arch is carried across the ducts by means of finger bricks situated at skewback level. Off this arch springs the producer gas tunnel which holds the nostril blocks, and off this arch again spring the combustion arches.

The accumulative effect of these arches is to slide the setting proper up between the pier walls, and it is for this reason that ample space has been left below the top arch. This top arch will lift of its own and will be raised by the pier walls, but probably insufficiently, and may not move so soon in the heating-up process as the work beneath it. In this connexion fig. 8 should be of help and interest, for it shows what actually goes on in pier walls during heating up. It can be seen that the heating up was more or less finished at the end of 30 days, and that the then pier walls were only about a day behind the chamber in reaching equilibrium. All the chart really tells us is that the rate of heating chosen was a safe rate and that the curve conformed with the type, gradual at the start and faster toward the ends, which we like for silica bricks. It was progressive all the time, with none of that going back which is so undesirable. What the lag in the pier walls would have been had we tried to heat up in, say, half the time we cannot even surmise.

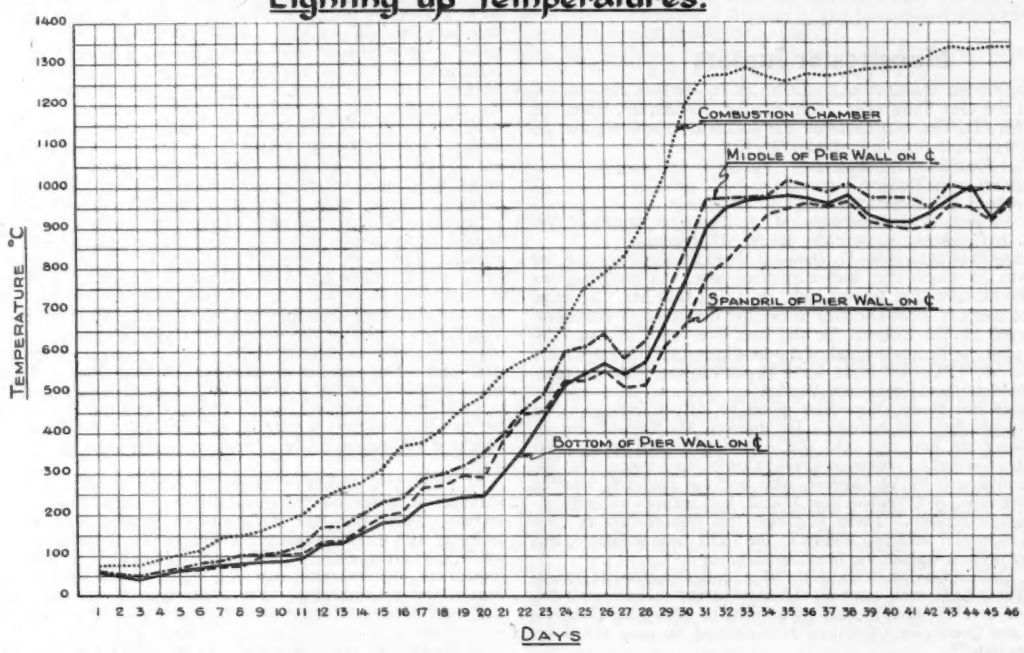


FIG. 8.—*Heating up chart of a section. Thermocouples were placed in the pier wall centres at top, middle and bottom. The temperature lag is thus illustrated.*

The top arches are of 90°, but in our later settings we use the 60° arches depicted in fig. 9. These give a much neater top—one, too, which is cheaper and easier to insulate. The arch proper is a single ring of end wedges, but it is covered with a ring of side wedges whose only function is to close the expansion joints. There is much to be said for the arched construction used here, because arches on cooling come back on themselves in a way which straight brickwork never does, and this is important in settings which have to keep gastight while going up and down a great deal. On the other hand, arches can be very troublesome if wrongly used.

Simple arithmetic will guide one as to the amount of expansion room required when the setting is fully hot, but it may not provide the complete answer during the time the setting is being warmed up. It does not much matter if the allowances are too great, but it does matter if they are too small—so it pays to be generous.

Section E-E shows how the expansion joints in the pier walls are arranged. Sections A-A and B-B show the expansion joints in the pier walls, top arches and middle walls, also the expansion arrangement for the stop blocks.

* Paper to the Southern Association of Gas Engineers and Managers (Eastern District), Oct. 23, 1945.

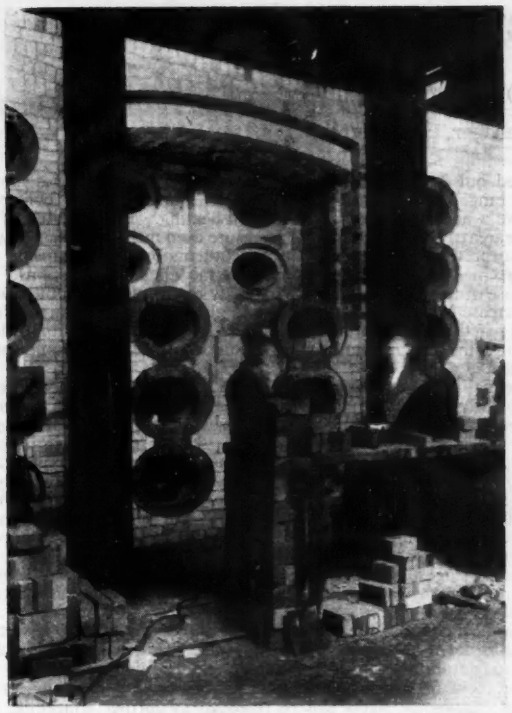


FIG. 9.—*Photograph of a setting with the latest 60° top arch.*

The top flue, which collects the waste gases from the dampers, transfers its contents to the bottom main flue by means of downcomers in the end buttresses. These downcomers have to be protected from crushing by the accumulative thrust of all the many transverse arches which transmit their thrust to the end buckstaves. Section D-D shows that the downcomers are arched to withstand this pressure. The thrust falling on the arch is then resolved into two forces at right angles, one falling on the end buckstaves and the other on additional front and back buckstaves shown next the corners. In my opinion, though the structure seems very satisfactory, it would have been better to have treated the whole of the end buttress in this manner, rather than have used cross bracing on one half.

We have no water gas plants, so our horizontal retorts have to take all the up and down work. Despite this they remain remarkably tight, so all the care we have taken to accommodate expansion and to provide flexibility in the structure may have been well worth while.

Someone may ask, Why use 21 in. by 15 in. oval retorts? The first and main reason is that we have found them the most satisfactory size in practice, for fatter retorts give very little more throughput. Oval retorts give a symmetrical door shape, which is relatively easy to keep tight; their only fault is that the major axis should be vertical, and then their throughput would be increased amazingly; but this would mean so much alteration to existing machinery and ancillary plant that one hesitates to recommend the innovation. The improvement would arise because most of the heat from the combustion chamber travels horizontally and, as everyone knows, heat penetrates into a mass of coal according to a square law. This means roughly that if the thickness of the coal is doubled it will take four times as long to carbonize. Having turned all the retorts on edge, the next obvious step is to join each column up into a long narrow slit and pour the coal in through the top. Thus most of our complications of operation and all the puzzles and worries of horizontal retort designers would be at an end. This is the logical development which is bound to become universal, though the old order is, like Charles II, "unconscionably long a'dying."

A Brick-built semi-detached house erected in eight weeks and the prototype of 2,000 to be erected in Leeds at £1,200 each, complete with gas refrigerator, was opened recently by Sir Granville Gibson. It is the first house in Leeds to be built by private enterprise since the war ended.

Many would like to speak well in public. For aspirants to this complicated art Miss Gladys Burlton has written a booklet, "Hints on Public Speaking," addressed to teachers, preachers, politicians, business men—"all who wish to inform, influence, or entertain an audience." The booklet is published by the Burlton Institute, 30, Manchester Street, London, W. 1, and the price is 3s. (post free 3s. 3d.).

Eastern Counties Association

The Autumn Meeting of the Eastern Counties Gas Engineers' and Managers' Association was held at Grosvenor House, London, on Oct. 29. Mr. J. HUNTER RIOCH (President) was in the Chair.

The PRESIDENT, in opening the meeting, expressed his pleasure at seeing such a large audience, which included a number of guests. He specially welcomed Dr. Braunholtz, Secretary of the Institution of Gas Engineers—who was also representing the President of the Institution—and expressed the thanks of the members for the assistance Dr. Braunholtz was ever ready to give the Association.

Continuing, he said that, although the war was over, very many problems had to be faced, not the least of which was the reorganization of the Gas Industry. In that connexion he remarked that he was speaking for all the members of the Association when he said they were determined to support the Ministry of Fuel and Power to the utmost, and this gave him the opportunity of welcoming several representatives of the Ministry—Mr. Kelf Cohen, Major Hyde, Mr. J. F. Smith, and Mr. McCrae—and to thank them for the sympathetic consideration which they gave to the many problems of the Gas Industry. He said it was his painful duty to report the death of Mr. George Dixon, who had been a member of the Association since 1932, and who was President of the Institution of Gas Engineers in 1940.

The following new members were elected: A. F. Grant (Ipswich Gas Company), L. P. Chapman (Engineer and Manager, Skegness Gas Department), H. Shackleton (Engineer and Manager, Gainsborough Gas Department), J. W. Parker (Engineer and Manager, Tring Gas Company), S. Smith (at present Manager of the Paisley Gas Company, but taking up appointment as Engineer and Manager of the Romford Gas Company on Dec. 1), and E. O. Rose (Tottenham Gas Company).

Proposals for the revision of the Rules were then considered.

The PRESIDENT said the decision to revise the Rules of the Association had been prompted by three main reasons: First, because of the change in the year of the Association, which resolution was adopted at the last meeting; secondly, because the Committee had found it increasingly difficult to arrive at their recommendations as to membership, owing to the lack of clarity in the existing Rules as to qualifications; and thirdly, because of the Committee's desire to line up the constitution of the Association with that of the Institution of Gas Engineers, to which it was affiliated.

Summarizing the principal alterations he said they were as follows: To alter the name of the Association from "The Eastern Counties" to "The Eastern Association of Gas Engineers and Managers," as this was more in keeping with the actual area covered. The scope of the Association's objectives has been widened and powers to operate a Benevolent Fund have been introduced. The qualifications of members and associates had been clarified, and this had made it possible for representatives of the contracting side of the Industry to become members of the Association. It was believed that the Association was the first District Association to take this latter step. There was to be a slight increase in subscriptions, and the present Committee managing the Association was to be replaced by a Council, which it was believed would raise the status of the Association. Other alterations included provision for a representative of the newly formed Education Committee to be an ex-officio member of the Council, there were various modifications with regard to the Vice-Presidents, nominations for members of Council, the position of the Secretary, and there was power to grant affiliation to Junior Gas Associations. It was hoped that the formation of a Junior Association in the Eastern District would be achieved in the not too distant future.

After a short discussion, the proposed alterations to the Rules and Regulations were unanimously adopted.

Mr. G. C. HOLLIDAY, one of the authors of the Paper "Technical Aspects of the Gas Industry's Contribution to Post-war Housing," presented at the annual general meeting of the Institution of Gas Engineers, then gave a résumé of it, and it was discussed in accordance with the wish expressed by the Council of the Institution that the Paper should be considered by the District Associations. A report of the discussion will be published subsequently in the "JOURNAL."

During the Five Years of the Company's participation in the Churchill Tank programme, 219 new vehicles were produced by Broom & Wade, Ltd., at their High Wycombe works, and no fewer than 1,147 tanks were completely dismantled and "re-worked" under the "Churchill Overseas Re-work Programme." By producing an almost phenomenal number of air compressors and pneumatic tools of numerous types, the Company indirectly assisted practically every industry in its war effort. The story of the Company's wartime activities is told in the October issue of the "Broomwade" *News Bulletin*.

The Stoke-on-Trent Corporation has received the sanction of the Ministry of Health for the borrowing of £111,600 for the installation of an 8-million cu.ft. capacity per day purification plant, and £151,032 for a 5-million cu.ft. gasholder.

The Plymouth and Stonehouse Gaslight & Coke Company announce dividends, payable on Jan. 1, 1946, for the half-year ended Sept. 30 at the rate of £5% per annum on the Ordinary Stock, 7s. 6d. per share on the "Additional" Shares, and 7s. per share on the New Shares, Act 1879, less Income Tax at 10s. in the £.

Town Gas in the Glass Industry*

By R. J. BRADSHAW
Deputy Gas Engineer and Manager, St. Helens

THE actual demands for new, heavy and urgent gas loads are often difficult to cope with, especially during a war period; therefore, a brief reference to the war load requirements of St. Helens and how they were met may be of interest.

There was a fall in consumption over the two years 1939 and 1940, principally due to absence of street lighting; an increase in output of 55% from 1940 to 1944 is principally due to industrial loads. A reduced consumption by domestic, small industrial consumers and public lighting, during the period 1937 to 1943 of 29% enabled the industrial load to expand almost concurrently with the reconstruction and expansion of the carbonizing and purifying plants; but owing to labour and material shortages in 1941–42 additional plant was not completed until autumn, 1943, and the difference between gas made and sold was balanced by purchasing gas.

The peak amount of gas purchased and sold over one week was reached in 1943 with 6,078,000 cu.ft. The gas purchased was from the Liverpool and Prescot Gas Companies through a temporary overland 10 in. C.I. flexible jointed main linking the trunk district mains of all three undertakings. At each junction booster and meter stations are provided, one at the Liverpool/Prescot boundary and two at the Prescot/St. Helens boundaries.

Booster Stations

The booster stations are of brick construction, electrically lighted and powered, arranged for delivery in either direction and containing the following equipment: duplicate inlet pressure regulator, diaphragm gas-operated electrical cut-off switch, B.M. meter, duplicate 45,000 per hour 8 in. differential pressure Rateau-turbo boosters, direct coupled to 4 h.p. flame-proof squirrel cage motors, duplicate outlet pressure regulator, the latter fitted with a by-pass and non-return valve; all of Bryan Donkin construction.

The advantage of the system is that the district pressure of the supply undertaking is safeguarded by the inlet pressure regulator being set at 25/10ths, and the pressure of the immediate area of the receiving district is kept constant by the outlet pressure regulator. The electrical cut-off valve is an extra safeguard for the district pressure of the supply undertaking, by cutting out the motor in the event of this pressure reaching 25/10ths.

A Fortunate Circumstance

Fortunately the declared gas calorific value of all the three undertakings concerned was identical. The joint supply worked most smoothly, and enabled the local Gas Industry to secure loads which would otherwise have been lost to other fuels, and also allowed the St. Helens Undertaking to install the necessary plant to take over the additional load. The whole of the work of plant extension and meeting increased gas consumption was carried out without endangering the continuity of supply, while three undertakings were in a position to give instant mutual aid. This arrangement was most useful to Prescot Gas Company when the undertaking was bombed.

The general district pressure was cared for by increasing the pressure at the outlet of the main district governors from 5 in. to 7 in. W.G., and a general improvement of service to the consumer resulted. In spite of this, the unaccounted-for gas figure fell by 2.5%, but this was partly due to the increased consumption and keen attention to all matters appertaining to this subject.

Optical Glass

The manufacture of optical glass presents the most difficult problems of the glass industry, and since it is in this section of that industry that our town gas locally has found its largest wartime consumer, I present a brief description of the process.

The first requirement of optical glass is to bend white light while transmitting all the colours. It is difficult to produce even small pieces which possess the correct average refractive index for white light and the desired difference of refractive index between red and blue light with high transmission for light of every colour ; and for the Fighting Services such pieces, large as well as small, must be produced in their thousands to rigid specifications, and this demands the highest skill of applied science.

Only a rough outline of manufacture can be given. Purity of ingredients, cleanliness of plant, and the ability to maintain and repeat heat treatment conditions are the essential factors to maintain output, which is followed by a great saving in costly materials and labour.

The finely ground and carefully-sized constituents, of great purity, are proportioned by weight and thoroughly mixed mechanically. The resultant mixture, termed "batch," is placed into pots which have been preheated in soaking furnaces, the melting generally being carried out in single pot melting furnaces. These furnaces have a good range of temperature up to 1,500°C., and are easily controlled to give a neutral atmosphere and even heating. Even heating of the entire area of the pot is essential to ensure even melting of the "batch," and to prevent separation of the constituents by selective fusion and displacement followed by changes in the chemical reactions. An increase of temperature with the majority of chemical reactions means an increase in the rate of reaction, and glass melting follows this rule; if the reaction is not carefully controlled by careful regulation of temperature the pot is attacked by fluxing and the glass composition affected.

The main aim in melting is to obtain homogeneity, which is achieved in the early stages by the evolution of gases from the batch materials termed "fining," and later by mechanical stirring with the aid of a water-cooled rod of ceramic material. During the stirring process, which extends over a number of hours, the temperature is considerably raised to complete the evolution of gas and to lower the viscosity to enable the gases to escape to the surface, on the completion of which the glass is said to be "plained." Finally the temperature is rapidly reduced and stirring continued until the mass has stiffened, to prevent settling and thus avoid the formation of striae.

At this stage the pot is generally removed to the soaking furnace or annealing oven, where it is allowed to cool to normal temperatures over a period of days.

During the final slow cooling, a glass containing over 60% silica is prone to devitrification or crystallization. On the other hand, rapid cooling results in non-uniform temperature distribution and the development of strain. Both these defects make a glass useless for optical purposes. Stress can be removed by further annealing, and devitrification is avoided partly by a suitable choice of composition, but mainly by strictly controlling the temperature during cooling according to a precisely worked-out schedule.

When the glass has reached atmospheric temperature the pots are removed from the soaking furnace, broken away from the solidified mass of glass, and the glass reduced by cleaving into lumps which permit easy handling for visual examination and selection, provided that the refractive index is right—otherwise the entire melt is discarded. The selected lump glass is prepared by cutting or moulding into rectangular blocks for final selection, by grinding and polishing at least two faces parallel to each other so that they can be viewed by transmitted light. Fine striae are revealed by deflection of the rays of light from a point source and appear as dark lines or bands. If the striae are local they can be removed by cleavage and grinding, provided that the resulting piece of perfect glass has sufficient mass to form the required lens or prism.

Within recent times it was customary to reject up to 4/5ths of a melt as unsuitable for optical purposes which, together with the cost of the destroyed melting pot, fuel, labour and time spent in breaking down the melt for selection purposes, will give some indication why this glass is so costly.

From the above brief description it will be seen that town gas, with its ease of control, constant quality, and supply with the absence of foreign matter, and flame construction, is an ideal fuel to satisfy the exacting demands of the optical glass manufacturer. The great savings that have resulted from its use in overcoming rejection of melt have made it more than competitive in price with other fuels.

The glass at this stage is free from all defects other than strain, and requires shaping or blanking in order to reduce the costly process of grinding. The glass is shaped by first slowly bringing it to its particular softening point, usually between 500° and 880°C. in a gas-heated hearth furnace, from which it is transferred to a gas-heated moulding press; here care has to be exercised in adjusting the temperature of the moulds, or crazing of the surfaces will occur. The avoidance of strain in optical glass is imperative, and it is in this field in particular that gas, with its ease of control when used in conveyor type ovens or lehrs, has affected big savings.

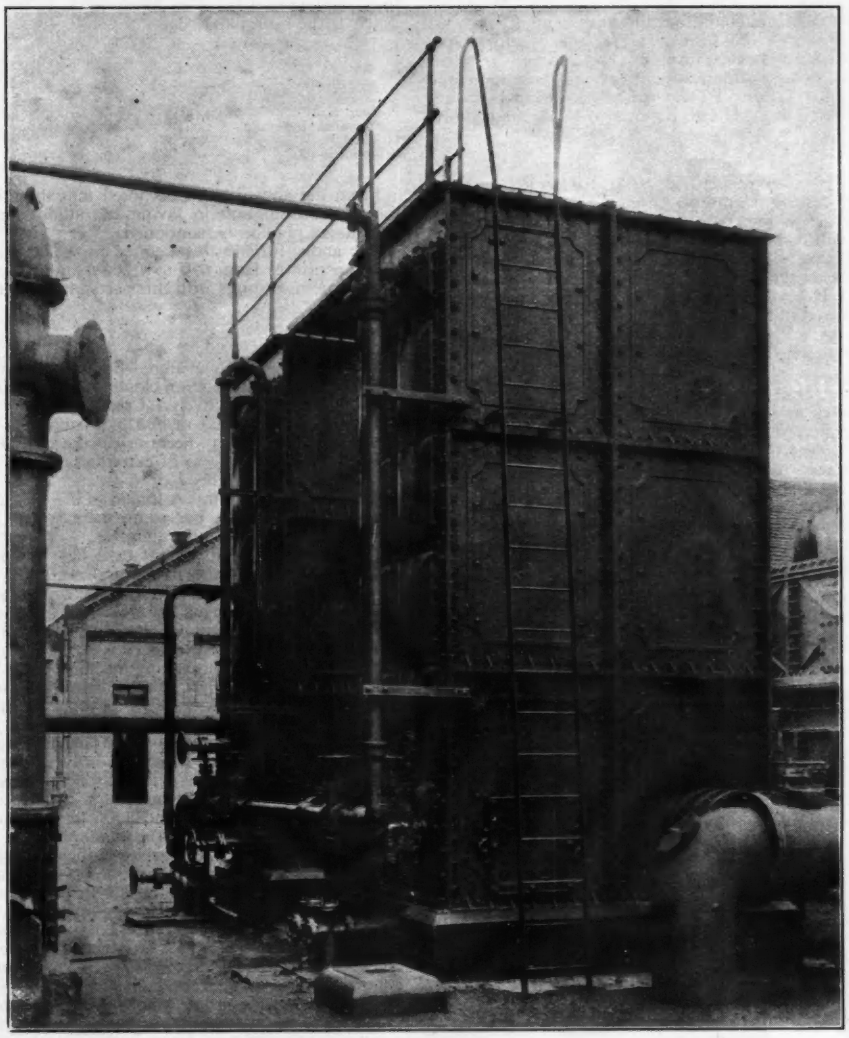
At or near the annealing temperature a very small fall of temperature may reduce the rate of release of strain to one-half or even less. It follows, therefore, that in order to maintain a high output from lehrs, precise temperature control is imperative. Moreover, the temperature zones are numerous (though little can be said of this or of the following treatment of the glass), but the problem is to cool the glass down without the re-development of the strain.

Oil is the chief competitor of town gas, and its chief advantage is in its speed of melting owing to its high calorific value for a given volume. Its chief disadvantages are related to control of temperature and furnace atmosphere, contamination of the glass, and maintenance, all of which are due to the inability to maintain perfect working of the burner. Minute alterations in the oil flow change the furnace atmosphere from the desired neutral condition, and foreign matter or carbon deposits on the burner easily deflect the flame and result in temperature alterations and damage to the furnace lining; moreover,

* From a Paper to the Manchester District Association of Gas Engineers.

Dempster OF ELLAND

for CONDENSERS



Two Horizontal Tube Water-cooled Condensers, each to deal with 1½ million cu. ft. of gas per day.

ROBERT DEMPSTER & SONS LTD.

Head Office and Works:
ROSE MOUNT, ELLAND, YORKS.
Telephone: Elland 2241–3.
Telegrams: Dempster, Elland.

London Office:
16 QUEEN ANNE'S GATE, S.W.1.
Telephone: Whitehall 2661.
Telegrams: Ellandors, Parl, London.

droplets of oil, if splashed into the pot during "plaining," cause streaks or striae in the glass.

Producer gas has the advantage of lower cost, but suffers from lower calorific value and corresponding slow melting power. Necessary washing to remove dust and harmful matter also extracts heavy hydrocarbons, which contribute considerably to the calorific value as well as cooling the gas (loss of sensible heat), thus further increasing the melting time. If carbon particles from producer gas (as also experienced in the case of oil) reach the glass, they react with the metallic oxides and form gas bubbles or "seed" in the glass. Temperature control is difficult owing to impurities such as dust, sulphur, and tar interfering with the control gear. Moreover, these impurities, as in the case of oil firing, cause slagging of the furnace crown, and droplets are liable to fall into the molten glass, through which it will traverse and form streaks or striae.

The deterioration of furnace linings is a serious item: the risk of contaminating the glass is in proportion to a lining's life, and we believe that the maintenance costs of gas-fired furnaces are much lower than that of oil-fired furnaces of the same capacity. We know of single pot oil furnaces being rebuilt four times per annum, as against once per annum for a gas-fired furnace. The loss of output per furnace, and the need for additional furnaces if rebuilding is required more frequently, are obvious disadvantages of oil firing compared with firing by town gas. For all these reasons town gas was undoubtedly much favoured at St. Helens for optical glass manufacture.

Furnaces

I would like to describe some experiences at St. Helens in connexion with certain glass processing relating to furnaces and the application of heat, following which a few notes are given upon an interesting new process which will come to the fore in the future—namely, the production of glass fibre or glass mat. Town gas in future will, we believe, be used extensively in the production of glass mat made from glass fibre, and in St. Helens town gas is already being used for some of the processes involved in this manufacture.

Preheating

(a) *Normal Furnace.*

When it is necessary to know the quality of a glass before it is finally fashioned, the molten glass is first cast or rolled into convenient forms, annealed and cooled, followed by inspection and selection. The selected glass is then reheated, moulded by pressing or blowing and re-annealed before finally cooling.

A common type of reheating furnace has a chamber 12 in. deep, 3 ft. long and 6 in. high, open on one side and divided by a low baffle wall in the centre, over which pass the products of combustion forming softening and preheating chambers. To the latter is attached a chimney and damper. These furnaces are invariably town gas fired.

The softening chamber is heated from the side by a town gas inspirator burner with a temperature range of 600° to 1,200°C. The products of combustion are made to flood the chambers by regulation of the damper, and the baffle wall prevents direct radiation reaching the preheating chambers. The open side is to permit ease of handling pieces of glass by tongs through the chambers and fashioning plant to the annealing lehr.

In the original furnace, temperature control was carried out by hand regulation of the gas and air cocks, with its attendant waste of fuel by ultimate lack of attention, followed by unevenness of temperature and varying glass output in quantity and quality. To overcome these defects thermostatic control was introduced.

A "Perfecta" gas thermostat with a maximum temperature of 600°C. is housed immediately beneath the products flue and screened from direct radiation from the combustion chamber, in conjunction with a relay valve. To control the air supplies a Bryan Donkin 587A type service governor is used.

A steady prearranged temperature was maintained in the combustion chamber over a temperature range of 560°C. to 940°C. with a variation of 3°C. at the higher temperature, as measured by a platinum-platinum rhodium thermocouple in the centre of the hearth. The equipment is cheap and simple to install and easy to maintain, but the most important factor is its ease of adjustment.

(b) *Radiant Heating.*

The introduction of radiant heating to this type of furnace has overcome the difficulty of uneven heating experienced with the single inspirator burner, and at the same time has permitted the retention of the open front—a most desirable feature for the work in hand, but which in the past has presented many difficulties in the way of fuel efficiency and output.

The crown of the standard furnace was removed and replaced by a Radiant Heating, Ltd., No. 3 panel designed for a surface temperature of 1,100° to 1,200°C., the radiating surface of 117 sq.in. being formed from extruded china clay tubes through which the air and gas mixture issue and burn on the underside of fingers made from similar material, the heat passing through the finger to the outside surface, from which it is dissipated by radiation. The surface was suspended 6½ in. above the hearth, and the gas for combustion injected into the burner with air at a pressure of 12 in. W.G.

Immediately this furnace went to work it was noticed that the temperature was more rapidly attained and remained constant for a particular adjustment, and it was found possible to reproduce accurately any given temperature by setting a special type of gas tap fitted to the radiant heat burner; also that the hearth of the furnace was far more even in temperature and the available working area considerably increased. Moreover, the appearance and atmospheric conditions surrounding the furnace were greatly improved, which added to the comfort of the operators.

In order to assess the improved efficiency of this furnace, a series of test measurements and gas consumptions was taken and compared with other measurements taken on a furnace of the original design; the hearth of the furnace in each instance was marked out into 1½ in. squares and temperatures taken by means of an unsheathed platinum-platinum rhodium thermocouple at 1½ in. intervals over the entire surface of each hearth. The temperatures and measurements were taken after the furnaces had been at work for a period of four hours and are shown and summarized in the following table:

(The average temperatures being arrived at by excluding those measurements taken over the front 3 in. of the hearth and those taken at the right hand edge.)

	Minimum Temp. °C.	Maximum Temp. °C.	Average Temp. °C.	Mean Average °C.	Gas Consumption (cu.ft. per hour).
Radiant Heat Furnace	1,061	1,267	1,164	1,173.4	378
Original Furnace	905	1,310	1,107.5	1,163.1	451

From the above it will be noted that there is a saving of 19% in the gas consumption in favour of radiant heating, apart from the advantages previously mentioned.

The above furnaces were tested for gas consumption over a range of temperatures from 650 to 1,200°C., and there is no saving of gas at lower temperatures with this particular design of radiant panel.

Glass Fibre

There are two types of fibre—namely, "continuous" and "staple"; their commercial application closely follows their natural counterparts, silk and cotton respectively. Continuous fibre is generally produced from high quality glass melted in a small gas-fired tank furnace to ensure the homogeneity necessary if the resultant filaments are to be of uniform thickness and of extreme fineness. Upon these qualities depend the "bendability" or the capacity to form loops or knots and the tensile strength. A thread of 0.7 mils. diameter with a tensile strength of 38,000 lb. per sq.in. increases to 150,000 lb. per sq.in. when reduced to 0.23 mils. diameter.

To attain this quality great care has to be exercised during the melting stages to ensure that homogeneity of the resultant glass is obtained, and in some cases mechanical stirring is applied to achieve this object. When the melt at the delivery end of the tank has become sufficiently homogeneous (a test sample of the glass will draw at a specified rate for a given temperature), the glass is fed by a trough or feeder to a glass marble-making machine.

The feeder is generally a rectangular trough built from closely fitting unjointed refractory blocks with an arched roof, through which pass the gas-fired ports for keeping the metal at the required temperature. The town gas consumption fired through inspirator burners on to the surface of the metal is particularly heavy. The reason for its use in preference to other fuels is due to its cleanliness in not contaminating the glass by introducing foreign bodies such as carbon, iron, and other metallic oxides, and the control of temperature and atmosphere is simplified and accurate. In the manufacture of thread, the advantage of forming the glass into marbles is the ease with which marbles can be handled automatically to supply glass at a constant rate to the drawing furnace without disturbing the temperature and, in turn, the viscosity of the glass at the drawing nozzle.

The marbles are melted in platinum boat-shaped furnaces (or bushings), the base of which is pierced by parallel rows of holes (51 holes to a row, and 2 or 4 rows to a head), through which the glass issues in the form of tears. The tears are drawn by hand towards and over a drawing drum, which, by its rapid rotation, continues the drawing process at some 100 ft. per second. The size of the filaments produced (one or two ten-thousandths of an inch in diameter) is dependent upon the size of nozzle, the temperature or viscosity of the glass, and the speed of drawing, whilst the length is only governed by the carrying capacity of the drum. The filaments are gathered together on their passage to the drum in groups of 102 or 204 to form a thread and are inter-fibre lubricated.

The manufacture of staple fibre is performed by utilizing the high velocity of superheated steam; the length of the fibre is from 4 in. to 16 in. The product is generally spun into thread in the same way as cotton fibre is spun: it does not need to be so uniform in thickness but a high quality of glass is needed, otherwise the "tears" are not drawn uniformly by the superheated steam, and the nipples of the platinum bushings may become stopped up. For producing glass fibre in the form of blanket or mat—generally called in the trade "bat" wool—the glass on leaving the tank furnace enters a modified feeder which acts as a drawing hearth, the base of the feeder being built up with platinum bushings carrying 28 nozzles from which the glass issues on heating. High velocity steam is directed on to the nozzles,

The RENOWN
A PRODUCT OF Parkinson
PIONEERS OF 'CLEAN LINE' COOKERS
The "Renown" is an outstanding example of design and development and a notable contribution to the part the Gas Industry plays in the well-being of the Nation
SALUTE
MR THERM
THE PARKINSON STOVE COMPANY LTD STECHFORD BIRMINGHAM 9

Large-Scale Cooking and Serving of Food

MAIN APPARATUS is designed to stand up to heavy work. It combines reliability with the utmost economy in fuel consumption, and is finished to ensure cleanliness in use.

The complete planning and equipping of Kitchens for Hotels, Canteens, Institutions, etc., can be entrusted to MAIN specialists, whose long experience of catering problems, large and small, is at your service.

MAIN

R. & A. MAIN LIMITED
LONDON AND FALKIRK

the molten glass being attenuated into fibres which are directed to a gathering chamber and inter-fibre lubricated *en route* by oil spraying.

At the gathering chambers the numerous fibres are placed automatically in the form of a continuous blanket, some three or more inches in thickness. From the gathering chamber a continuous conveyor removes the mat as it is formed and passes it forward through convector town gas fired drying ovens. It is then compressed to the desired density, after which it is handled as a kind of blanket or felt, and in some instances continues on the conveyor to be placed into covers of paper, canvas or glass cloth and secured by adhesive or sewing, to be followed by guillotining into required sizes.

Although the bulk of both staple and continuous fibre is treated on similar lines to cotton and silk, an entirely new development is rapidly growing which makes use of the great tensile strength, high softening temperature (800°C.) and durability against corrosion, fatigue and resistance to solvents, by embedding the fibre in plastic materials to act as reinforcement. It is interesting to note that this new material, when used in the construction of aeroplane bodies, is given a strength to weight radio of 33, which is superior to aluminium at 22 and birch plywood at 18; moreover, the material can be moulded or made into sheets and treated under heated presses according to the type of plastic binder used.

Sand Drying

In the manufacture of glass where sand is used as an ingredient it is necessary to reduce the moisture content to about 2%, or otherwise the glass is liable to contain "seed." If the batch contains hygroscopic substances such as carbonate of soda, and salt cake, these may absorb water from the wet sand during mixing, causing lumps or balls of sand not properly mixed with the rest of the ingredients. Further, if a batch is allowed to stand before mixing it is liable to cake together—either balling or caking of the mixture can give considerable trouble during melting, and cause lack of homogeneity in the finished glass.

The most common methods in use for the drying of sand are producer gas-fired rotary driers, but a new method as designed by the Kestner Evaporator and Engineering Company, Ltd., already well established for the drying of powders, is being considered for the drying of sand. This process would also have the advantage of extracting dust, and of elevating the sand to overhead bunkers. As we have found this method through our own enquiries, and as it is likely to be of much importance to any gas engineer considering drying problems with powders, sand, and other similar materials, we feel a description of the plant is of value.

The wet material is fed into the base of a vertical drying column, some 40 to 50 ft. high, up which it is blown by a stream of heated air. The material laden air is diverted at the top of the column into a cyclone collector, the base of which is provided with a discharging valve to extract the dried particles of material, while the dust is carried forward into a duplicate battery of bag filters. The batteries are coupled to an automatic changeover, so that each battery in turn becomes isolated from the flow of dust-laden air. The material to be cleaned is fed with a supply of clean air in the reverse direction and at the same time the bags are shaken. The powder collected therein becomes displaced and falls into the lower collecting hopper of the machine. This process takes place on a fixed time cycle, so that each unit is cleared at an interval of about five minutes. The cleaned dry material and the separated dust are removed continuously by screw discharges.

The air supplied by a multivane type fan is heated to approximately 400°C. in an air heater utilizing town gas, producer gas, or coke; and as the water retained in the dry product depends fundamentally upon the temperature of the air leaving the plant, this temperature—normally 70°C.—is maintained thermostatically, the nature of the thermostatic control depending upon the method of heating the air, which, of course, could well be done by town gas or coke.

A particular feature of this type of plant is the extreme flexibility with which materials having a wide range of moisture content can be dried to a pre-determined figure, provided the fluctuations do not take place spasmodically or over intervals of less than ten minutes.

The drying time of the material, usually from 3 to 8 seconds, is adjusted by the velocity of the heated air, the general range being from 50 to 100 ft. per second. Materials successfully handled to date have had moisture contents from 4 to 10%, and there is no difficulty in dealing with light or heavy substances.

The Target Figure of 50,000 visitors to the "Coventry of the Future" Exhibition was easily exceeded. The total for the fortnight was 57,500 (including 2,000 schoolchildren). This represents a proportion of more than one in five of the population of the city.

In his Presidential Address to the Fuel Luncheon Club, Sir John Dalton said that it should be announced to the thousands of able-bodied men now coming out of the forces that mining is a job with a great future; a job which entails about 5½ hours' a day hard work and which, in the future, will probably only be for 5 days a week with increased mechanization, and which, at the end of the week, is remunerated by a pay packet containing anything between £5 and £14 a week, according to ability and willingness to earn it. He thought that many men would view the prospect cheerfully, and the country would begin to get a new mining population which was so sorely needed.

Municipal Undertakings' Results

Burnley.—The Annual Report of the Gas Department for the year ended March 31 shows that the cost of manufacture and distribution was 17.79d. per 1,000 cu.ft. of gas sold, compared with 16.28d. for the year ended March 31, 1940, an increase of only 1.51d. or 9.2% during the five years of war. The total cost of gas, including tax and capital charges, was 34.79d. compared with 33.17d. in 1940, a comparatively small increase of 1.62d. per 1,000 cu.ft., or 4.8%. There has been no increase in the price of gas during the last five years, but the average price received, due chiefly to an increase in domestic consumption, has risen from 33.99d. to 35.55d. per 1,000 cu.ft. The increase in gas sold during the last five years, amounting to 209 million cu.ft., or 25.2%, has been a big factor in enabling the working costs to be maintained at such a satisfactory figure. The net profit was £3,278, against £3,407 for the previous year, and the total gas sent out was 1,113,008,724 cu.ft., against 1,063,561,237 cu.ft. The peak daily consumption was reached on January 28, when a total of 4,811,000 cu.ft. was recorded.

Darlington Gas Department shows a net profit of £10,895 for the year ended March 31, 1945.

Motherwell and Wishaw.—A decrease of 10.14% in the total make of gas compared with the previous year is recorded in the annual report for the year ended May 15. At 660,145,000 cu.ft., however, the output was considerably higher than in any previous year, excepting the two abnormal years ending in May, 1943, and 1944. In the last complete pre-war year the total was 441,205,800 cu.ft., and in the year ended May, 1940, it was 493,653,000 cu.ft. The net profit for the year was £5,887, which, together with a surplus of £7,841 brought forward, has been used to defray capital expenditure totalling £15,881, leaving £1,852 to be met from next year's revenue. The benzole recovery plant commenced operations in November, 1941, and since that date has produced 217,000 gall. of crude benzole. Among other difficulties with which he has had to contend, the Engineer and Manager mentions that queues still impede the work of the slot meter inspectors and collectors, as it is not uncommon for a second and third call to be made on account of the housewife being absent on a shopping expedition.

Smethwick.—Gross profit for the year ended March 31 carried to net revenue account was £48,336, compared with £52,196 for the previous year. After making provision for loan charges, income tax, &c., the net profit was £18,045, a decrease of £2,119 compared with the previous year, and the available balance outstanding was £24,392. Total gas sent out during the year was 1,212,952,000 cu.ft., against 1,273,473,700 cu.ft. for the previous year, but a considerable increase on the 1,023,601,100 cu.ft. sent out in 1939. On receiving the report, the Gas Committee expressed sincere appreciation of the services rendered by Mr. E. Hardiker in his capacity as Engineer and Manager, and particularly of the high standard of efficiency to which the undertaking had attained under his management and control. In presenting the report to the Town Council, the Chairman of the Gas Committee said the output of gas increased during the war to such an extent that it required the whole of the manufacturing plant to be kept in operation at the maximum capacity, and it was impossible to carry out essential repairs without assistance in the form of a bulk supply from Birmingham.

Stockport.—The report for the year ended March 31 shows a gross profit of £68,172, compared with £79,246 for the previous year. The outstanding debt was decreased during the year by just under £13,000 and now stands at £333,225, equivalent to £177 per million cu.ft. of gas made. A summary of results for the war years shows that gas sales have steadily increased. The total made in the year under review was 1,874 million cu.ft., an increase of 41% over the year 1939–40. Gas sold through prepayment meters increased from 409 to 606 million cu.ft., an increase of 50%, and industrial sales rose from 311 to 509 million cu.ft., an increase of 64%. With the increased tonnage of coal carbonized the amount of coke for sale increased by 37%. The price of coal went up by 72% and labour costs by 42%. Benzole production last year amounted to 1,250,000 gall. In presenting the report to the Town Council, the Chairman of the Gas Committee paid tribute to the able leadership of Mr. T. Reynolds, Engineer and Manager, to whom the thanks of the Stockport consumers were due for the very low price they enjoyed.

Walsall.—The Gas Department sold 918,357,000 cu.ft. of gas during the year to March 31, an increase of 6.34% over the previous year and a record for the undertaking. Compared with 1940 the increase was 47.6%. Despite an increased yield of gas from less coal, the cost of coal was £15,807 higher. The net profit was £30,466, against £22,027. Presenting the annual report to the Town Council the Chairman of the Gas Committee referred to the wartime work of the heat treatment department. Early in the war the Air Ministry decided to have 20 mm. cannon on fighter planes, but one of their acute problems was the shortage of cannon clips. A number of Walsall manufacturers were asked to fabricate the clips, and the Gas Department was made responsible for the heat treatment, protection against rust, inspection and testing of the clips. A German raider dropped a bomb on the gas-works a few days after they had undertaken the work, but they carried on. They promised to turn out 350,000 clips a week, but they managed to make 600,000 a week, and employing some 200 women their total output reached 100 million.

Testing and Design of Flued Gas Fires and Drying Cabinets*

By L. W. ANDREW, B.A., B.Sc., A.R.I.C.,
Gas Light and Coke Company, Watson House

THE main part of this Address deals with the testing of gas appliances, as I am convinced that outside the Gas Industry, and even perhaps inside it, there is a tendency to underestimate the implications and importance of testing. At this moment, when appliances are needed in great numbers, when manufacturers are applying new technique and new materials based on their wartime experience, and when appliance-testing laboratories are being reinstated for reconstruction purposes, it seems worth while considering any testing experiences which are available.

The effective testing of gas appliances is much more than the simple carrying out of a series of specified routine tests. While it is true that routine tests should be formulated so that the maximum number of useful facts can be recorded in an orderly manner, such recording is only a beginning, and several problems arise. First, the choice of the routine tests must be based on a thorough technical knowledge of the various factors which the tests are designed to detect, so that the results obtained are both practical and accurate. Secondly, it is necessary to interpret the results of the test; and it is here that full advantage must be taken of practical district experience. Thirdly, there are features of an appliance which cannot be set down as a simple routine test, but are known from experience to be important. Lastly, it should be possible to devise methods of overcoming weaknesses of design which become apparent during testing, so that all comments are constructive. My work at Watson House leads me to believe that routine tests to be effective must be under constant review, must be one part of a balanced programme of technical research and development, and also must be linked in the closest manner with the performance of appliances in the users' homes.

I have not attempted to outline all the normal routine tests for gas appliances, but rather to deal with certain aspects of testing. Gas fires and drying cabinets have been chosen as examples, as I have more experience of these than of other appliances, they are very different in function and therefore in testing methods, and they appear in the last few years to have reached a critical stage in design.

The part of the Address dealing with design again only refers to some general problems of design of gas fires and drying cabinets. Although the Industry has produced designs of which it is justly proud, this Address is not intended to show how good gas is at the moment, but rather to indicate the need of further development and research in design and testing to ensure that gas appliances can take the fullest advantage of the merits of gas as a fuel.

A Paper to the Institution of Gas Engineers this year—"Some Technical Aspects of the Gas Industry's Contribution to Post-War Housing"—deals in some detail with the correct choice of gas appliances, and such knowledge is basic in deciding which appliances shall be designed and tested. This factor must be remembered when considering the narrower aspects of design and testing of individual appliances.

TESTING

General

The main object of testing is to ensure that an appliance will give the best possible service to the user. Lying behind this simple objective there must be progressive research work; for example, gas fires are intended to make people comfortable, and it is essential to have the fullest possible information on the factors affecting warmth comfort conditions, the effect of wavelength of radiation emitted on comfort, scorching, glare, &c. It is only with the full knowledge of these factors that tests can be devised and interpreted.

Again, it is necessary to obtain the desired results at the lowest cost, and in order to estimate this cost it is important to measure the practical thermal efficiency. This practical efficiency may be different from a conventional efficiency as often carried out in the laboratory; for example, a gas fire with a full-on gas rate of 30 cu.ft. per hour may require under certain weather conditions a gas rate of 15 cu.ft. per hour to give the best comfort. If the control of the fire is such that in practice the user operates it at 20 cu.ft. per hour, then from the point of view of practical efficiency the effect on cost is almost the same as dropping the bench efficiency from 50% to 37%.

The total cost of an appliance to the user will include the running cost, capital cost, fixing cost, maintenance cost, and renovation cost; these factors must be considered for every appliance, and their interpretation and relative importance will remain to a great extent a matter of experience. Here again there should be the closest possible link between the laboratory, the district, and the user, so that all tests are really practical.

Three main types of test are normally used. Short period routine tests attempt to forecast the performance to expect from the appliance, to give some idea of the running cost and maintenance cost, and, in addition, serve as a specification for purchasing and checking deliveries of appliances. Life tests are long-period tests designed to bring out weaknesses in design or materials which may not be obvious during routine testing. An accelerated life test may, in a reasonable period of time, anticipate results to be expected over several years in use. This is comparatively simple for appliances which are used intermittently—for example, drying cabinets and bedroom fires—but living-room fires cannot be given a short life test, as they may well be used in practice 10 hours a day, and only 24 hours a day are available for life test. Some acceleration can, however, be obtained by intermittent usage, which normally reveals any weakness of an appliance more rapidly than continuous usage. The third class of information is obtained from district experience. In the Gas Light and Coke Company full use is made of a Home Test by means of which appliances are kept under observation for about a year in selected homes, after which a report is obtained from the user and the appliances are examined by the laboratories concerned. It is equally important to obtain reports from the district on appliances in normal use, to check all complaints, and also the conditions of appliances returned to Stove Works from the district. In my own view the above methods do not go far enough, and it is still necessary to go out to the district from the laboratory in order to examine appliances in the homes of people who have never complained and find out what standard the normal user expects from a gas appliance. I hope I may be excused here in referring to my Paper given to this Association in 1942—"No Complaints from the District"—which deals with the matter at some length.

It is assumed that a properly equipped laboratory is available in which all instruments can be accurately calibrated, and in which the gas used for test is adequately specified as routine in terms of calorific value, specific gravity, A.T.B. No., and when needed the complete analysis and air requirements for combustion.

Gas Fires

Safety.—B.S. 717 is the basis of all combustion tests, but certain special conditions of test, not included in the specification, have proved of sufficient value to be adopted by the Gas Light and Coke Company as standard for gas fires. Although information is incomplete on the effect of variations in gas quality on combustion characteristics, it seems desirable to ensure that a reasonably standard gas is used for all routine tests, and also that the tests shall take into account any likely variations in combustion characteristics of gas delivered to the district. As a tentative standard the gas used for combustion tests is of A.T.B. 75 $\pm$ 5 units; if the gas available for test is outside these limits it is doped with CH_4 to raise the A.T.B. number or CO to lower it to the necessary value.

Information is lacking on the effect of variations in gas quality on the possibility of sooting when non-aerated burners are used in gas fire design, and suitable routine tests should be devised. Although normally combustion tests are carried out with a steadily increasing inlet pressure from normal to 100% pressure overload, it is important to ensure that there is a definite peak on the curve of CO/CO_2 against gas rate, as this peak occurs on certain appliances at a gas rate below the normal full-on rate. Having obtained this peak value with gas of A.T.B. 75, the gas is modified to A.T.B. 90 and the CO/CO_2 redetermined. The possibility of lighting back under conditions of varying gas quality is checked by setting the appliance on gas of A.T.B. 75 and modifying the gas to A.T.B. 60.

As a final check, combustion samples are drawn off under a downdraught, as it is under this condition that good combustion is absolutely essential in practice.

A new aspect of safety which is now being covered as a standard test is a check of the effect of air vitiation. Our present technique is to set up the fire in a sealed room and find the CO_2 concentration at which combustion is seriously affected. This test is of particular importance if any fundamentally new designs of gas fire are introduced.

The final safety test is on fire hazard, and surface temperatures are taken on standard wooden hearths to ensure that there is no danger of scorching such materials as carpets. Temperatures in front of panel fires are taken with the fire fitted at a level of 6 in., 12 in., 18 in., and 24 in. above the floor.

In addition to these specific tests, such factors as the possibility of radiant breakage, accidental burning of clothes or accidental operation of the cock must be taken into account. At the moment a suitable standard test has not been settled, and the test sheets only record comments based on a comparison with existing fires.

* Presidential Address to the London and Southern District Junior Gas Association, Oct. 12, 1945.

CENTRAL HEATING AND HOT WATER PLANT AT PURLEY AND DISTRICT WAR MEMORIAL HOSPITAL

Five POTTERTON gas-fired boilers for central heating and the supply of constant hot water. Their combined output is just over 2,000,000 B.Th.U's per hour.

Our Technical Advisory Service will gladly assist with problems of selecting and installing similar systems.

NO INCREASE IN THE PRICE OF POTTERTON LAGGED STORAGE SETS

THOMAS POTTERTON {HEATING ENGINEERS} LTD.

CAVENDISH WORKS, BUCKHOLD RD., LONDON, S.W.18. *TEL*: PUTNEY 2263-4-5

C. & W. WALKER, Limited

DONNINGTON——————Nr. WELLINGTON—SHROPSHIRE.

FOUR PURIFIERS, EACH 35 FEET SQUARE.

COMPLETE PURIFIER INSTALLATIONS

ON GROUND OR OVERHEAD

WITH

MILBOURNE - BEARD RUBBER JOINTING, VALVES, FASTENERS AND DISCHARGE SHOOTS.

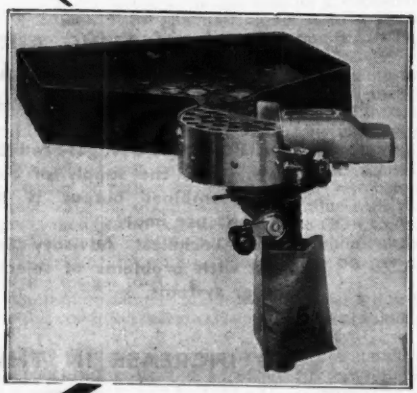
LONDON OFFICE - Temporary Address: DONNINGTON, WELLINGTON, SHROPSHIRE.

THIS MACHINE COUNTS FOR YOU!

How can any business which deals daily with large numbers of coins do without a counting machine? Is it fair to your business or your employees to rely on the human element when thousands of coins must be counted daily? Could not that human element be better employed doing other and more important work?

Many Gas Companies and the Wages Departments of hundreds of firms depend entirely on the service these machines can give. They are, in the first place, absolutely accurate . . . they stop automatically on £5 worth of silver and 5/- worth of copper . . . and they count at the rate of a 1,000 coins per minute.

All over the world these counting machines are proving their worth.



Also manufacturers of
ENVELOPE OPENING and ENVELOPE SEALING MACHINES

INTERNATIONAL COIN COUNTING MACHINE CO. LTD.

COLLEGE ROAD, CHESHUNT

Phone: Waltham Cross 3241–2

Practical Efficiency

Radiant Efficiency.—It is not possible here to consider in detail the difficult problem of measuring the absolute radiant efficiency of a fire. A modified Leeds method, using a radial area marked out in Russell angles and a directly calibrated micro moll thermopile, has proved satisfactory over a number of years, and a reproducibility of results to 1% is reasonably obtained. It is necessary to check the calibration of the thermopile at weekly intervals, and this is speedily done either against standard gas fires kept solely for this purpose, or against an under-run tungsten filament lamp mounted on a photometric bench and adjusted to give a predetermined light intensity. The thermopile is normally fitted with a fluorite window to minimize any effects of draught, but it is important to carry out check tests with this window removed if fires of notably different emission spectra are under test, as the absorption of the fluorite, although only small, is selective to certain wavelengths.

It is essential that the fire should be fitted exactly as it would be in practice. A hearth gas fire should be boxed in to a fireplace or, if an inset fire, into a standard firebrick, or if a panel fire, to the equivalent of a precast type of flue. It is necessary to check that any extra air inlets which might be available are operating when the fire is fitted up for test. It is desirable to use a suction fan to ensure a definite updraught, but precautions in making the connexion from the flue to the fire are necessary to ensure that at the same rate of flow in the flue the effect of suction is the same as in practice. Comparisons with the fire fitted in a typical fireplace are necessary to check the test bench arrangements. Tests are normally carried out with the fire just clearing the products, but in addition tests are necessary at an updraught of 2,000, 4,000, and 6,000 cu.ft. per hour, as such conditions are always obtained in practice, and the updraught may have a substantial effect on the radiant efficiency. The efficiency must be measured over the range of gas rates normally used in practice, usually from full on to one-third full on; for a living-room fire the efficiency at half and two-thirds full rate is more important than full on. The distribution of the fire is measured at a standard height of test bench to represent floor level, and is interpreted in terms of directly useful radiant heat—that is, radiant heat falling above the level of the hearth or floor.

Convected Efficiency.—The conventional type of radiant fire only makes available 2% or 3% of its heat as useful convected heat, and only a small error is involved if this heat is calculated from surface temperature and area. In the case of a convected fire the position is, however, entirely different, as the convection component may well give one-third of the total heat output. Two entirely different methods have been used and should, whenever possible, be carried out as a check on the tests.

The direct method uses a collecting device on the front of the fire to collect the warm air delivered from the convector outlets. It is then possible by metering CO_2 into the convector air inlets to estimate the volume of air passing through the convector, and by measuring the temperature of the convected air the direct heat content can be calculated. CO_2 rates should be adequate to give about 2% of CO_2 at the outlet to enable a Haldane apparatus to be used for the analysis. It is necessary to carry out blank tests on the CO_2 content of the laboratory air during the test period. A suction pyrometer provides a suitable method of measuring the temperature of the convected air. The collecting device must be of such shape and resistance that the flow of warm air through the convector fire is unaltered by the test. This is conveniently done by adjusting the resistance of the collector until the temperature of the convector box and outcoming warm air are the same with the collecting device on or off. The collector must be shaped to give an even distribution of CO_2 at the outlet and to be unaffected by radiant heat from the fire; if the shape is correct, a loose double layer of aluminium foil provides adequate protection from radiation.

The second method is an indirect one, and relies on the measurement of the flue loss, radiant efficiency, and surface losses of the fire, leaving the total useful convected efficiency to be calculated by difference. The only real problem is to measure the flue loss simply and accurately. Owing to the low CO_2 percentage in the flue gases, any attempt to calculate the excess air in the flue from the CO_2 content would not give results of sufficient accuracy. A method now on trial is to meter carbon monoxide and add it at the canopy of the fire. Samples of the flue gases can then be analyzed on a Vandaveer train to an accuracy of 0.001%. It is, of course, essential to carry out blank tests for carbon monoxide immediately before and after the test. An attractive alternative is to use a suction fan on a 5-in. flue to take away the products, and a Pitot tube or venturi meter in the 5-in. flue will give an accurate measure of the velocity, and hence the total volume passing.

An interesting check on the calibration of the Pitot tube has been carried out by supplying heat at the base of the flue by means of a simple non-aerated burner, with the fire out of operation. The heat content of the flue gases is then known; it is the heat input of the burner less incidental surface losses between the burner and the point at which the flue temperature is measured. The accuracy of such a method of test depends to a marked extent on keeping the surface losses from the surround and the flue as low as possible. These losses can be calculated sufficiently accurately from surface temperature measurements providing the total losses do not exceed about 5% of the total heat input.

The data on convected efficiency are carried out at different gas rates and under different conditions of flue pull as for the radiant efficiency methods.

Other Tests.

Control.—The appearance alight at different gas rates must be noted, as, in particular, the minimum gas rate a consumer is likely to use is that at which the fire still remains attractive. The ease of operating the cock at different gas rates should be noted, and an estimate made of the certainty with which the user can obtain the desired gas rate.

Construction.—The fire must be stripped into all its components, each component examined and specified, and the fire reassembled. The interpretation of the results is largely a matter of experience.

Ignition.—Here, again, a detailed examination is needed, but also life tests are of special value. It is important in life tests of a flint lighter to ensure that the flint has cooled between successive ignitions; a typical test is to allow a cycle of 6 ignitions in rapid succession, and then a delay of 5 minutes.

Maintenance and Fixing.—Accessibility, ease of use of standard tools, &c., are of great importance, and apart from a laboratory examination, advantage should be taken of the practical knowledge of those specialized in fixing and maintenance, and an appliance should always be fixed in its appropriate surround by an ordinary fitter and any practical difficulties are noted. The wider aspects of maintenance depend on experience and the more prolonged life and district tests.

Renovation.—The question of interchangeability, ease of renovation, effect on stocks, &c., must be considered with the department responsible for renovation.

There are certain special tests which are not yet covered as routine, but are always considered if a gas fire differs substantially from the conventional design. The emission spectra of the fire is recorded at different gas rates and compared with other fires. Comments are obtained on the "glare" characteristics of the fire at full rate—at the moment by visual comparison with conventional fires.

The final test on a gas fire is the practical one of heating a room. Rooms are set aside and heated to a standard condition, recorded either by a double eupatheoscope or a double globe thermometer and, over a prolonged period, the gas used to maintain comfort over 10 hours a day is compared with that used by other appliances. Tests of this type are constantly in progress, as more than one heating season is needed in order to smooth out variations of weather conditions. The tentative standard adopted at the moment is a back equivalent temperature exceeding 55°F. and a front equivalent temperature of 68°F.

Drying Cabinets

The general details dealing with safety, construction, &c., are similar to those for gas fires, but certain special tests are necessary because of the different function of a drying cabinet compared with a room heating appliance.

Safety.—There should be no serious possibility of scorching clothes placed in a cabinet even if they are improperly loaded by the user. The normal test is to allow clothes to hang down so that they touch the bottom of the cabinet and to check there is no visible scorching after half an hour at full gas rate with the cabinet full of dry clothes.

Practical Efficiency.—From a practical point of view it is essential to know exactly what weight of clothes can be handled in a single load, the time it will take to bring these clothes to the appropriate degree of dryness—*e.g.*, to the ironing stage—and what it will cost to do this. The capacity is normally expressed either in terms of the equivalent length of clothes line and/or the weight of clothes dry and wet. Speed of drying must take into account the types of garment used in a normal household wash—*i.e.*, cottons, woollens, silks, of different size and thickness. The practicability of the temperature control for different materials and for airing is checked during the test. The thermal efficiency should be measured in terms of the heat content of the water evaporated during the period of test by weighing the clothes at the beginning and end of the test. This efficiency is a simple method of comparing the performance of different drying cabinets providing the clothes dried are properly specified. The temperature distribution of a loaded cabinet gives a good indication of the uniformity of drying, but full data must be recorded of the speed of drying of individual garments in different parts of the cabinet. It is clear that it is an advantage to have an experienced female observer present the whole time the tests are carried out in order to ensure that the clothes are properly wrung before being placed in the cabinet, and to check that clothes are taken out of the cabinet when they have reached the desirable state.

Further development work is needed to produce standard satisfactory methods of test.

Other Tests.

Special attention must be paid to the ease of loading and removing clothes from the cabinet and the general ease of manipulation of the temperature control. The possibility of condensation in the room in which the cabinet is used must be taken into account, and tests are needed on the dew point and air temperature at the outlet of the cabinet during the whole drying test.

Attention must be paid to ease of cleaning the inside of the cabinet, and to ensure there is no possibility of fabrics becoming damaged either by sharp or projecting pieces or any roughness. In addition the materials of the rails must prevent any possibility of discoloration of the clothes—*e.g.*, there must be no rusting, corrosion, or exudation of resin. The cabinets may well be a part of standard kitchen equipment dimensions, and methods of fitting must be considered in relation to other standard units.

Gas Fires

DESIGN

Theoretical Maximum Radiant Efficiency.—The heat required at the flue outlet to give the necessary ventilation of a room and to ensure that the products of combustion are removed up the flue is so small that it does not represent a limiting factor. For example, in a heated room a flue will give satisfactory ventilation, even if there is no appliance at the base of it. A serious efficiency limitation, however, occurs if it is accepted that the top of a radiant must be at bright heat in order to give a good appearance. Although there must be some convected heat loss from the front of the radiant and some back losses from the fire, there are compensating heat gains to the room from the front casting and from the canopy and chimney breast, and, in addition, the top of the radiant may appear deceptively bright owing to reflected glow from the lower parts of the radiant; it is therefore likely that a reasonable theoretical maximum radiant efficiency is 60–65%. The average surface temperature of a normal gas fire, if calculated on the radiant heat emission and the radiating area or from its emission spectra, is only about 1,300°F. in spite of the bright appearance of the fire.

Theoretical Maximum Total Efficiency.—As soon as an attempt is made to utilize the heat from the top of the radiant by means of heat exchange devices giving convected air a much higher efficiency is clearly possible. It seems likely that the limiting factor is avoidance of condensation, and a figure of 80% should be practicable.

Practical Limiting Factors for Efficiency.—The CO/CO_2 ratio frequently introduces a limiting factor for the efficiency in practice, as sufficient excess air must be available in the radiant to ensure good combustion at normal and overload conditions. The size and shape of secondary air inlets and the taper inside the radiant must be determined precisely with regard to efficiency and combustion over the range of manufacturing tolerances which will occur in production.

Insufficient attention has been paid to the effect of flue pull on radiant efficiency. If the normal gas rate occurred at the point which now represents a 40% gas rate overload, it would be possible to turn the fire down to a much greater extent without serious loss in efficiency. The extended use of the duplex type of burner is another alternative method of retaining a high efficiency and good appearance at low gas rates. As far as the effect of flue pull is concerned, the modern tendency to break the flue pull by allowing extra air inlets to the flue at the sides of the fire is of real value. It may be that the designs of gas fires could be modified so that flue pull tended to help rather than hinder the radiant efficiency, as this phenomenon has already occurred on certain types of inset fire.

As far as convector fires are concerned the main problem in the past has been one of bulky appearance and high cost, due to complicated convector devices. It seems clear that proper attention to the principles of heat transfer could result in a marked saving in this respect. It is also desirable that the maximum rate of air flow should be aimed at in order to obtain the convected air at a reasonably low temperature; this not only increases the total efficiency, but also reduces any possibility of trouble due to scorched dust in the air and discoloration at the outlet louvre. It is easier to obtain a high convected efficiency if the fire is designed so that the products enter the convector heat exchange at a reasonably high temperature and are not diluted too much with excess air. The problem is to achieve this result, while ensuring that the fire clears its products with certainty under normal conditions of use.

Maintenance.—This is a very real problem with gas fires, as the mechanical strength of radiants has been totally inadequate in the past, and an annual maintenance has been needed to ensure that the burner setting has not changed. The modern tendency to adopt a separate front structure for the radiants either of the rod, slat, or biscuit type, and using the front face of the firebrick back as the back of the radiant appears to be a step in the right direction. Such design with the incorporation of a non-aerated type burner may well solve the maintenance problem entirely. There are, however, other difficulties induced by this change of design. For example, the tolerances required in manufacture are very much closer. Typical clearances at the top and bottom of the radiants of a fire using non-aerated burners are only equivalent to about $\frac{1}{2}$ in. and $\frac{1}{4}$ in. respectively, and when it is considered that these clearances are obtained between two separate components the difficulties will be realized. There are also severe refractory problems, as the front face of the back brick is at a very much higher temperature than has ever been experienced on a back brick supporting a complete separate radiant.

The non-aerated or "neat" gas burner is a real advance from the maintenance point of view, but further work is needed to compare the non-aerated, the normal aerated, and the fully aerated burner as applied to gas fire design.

The outstanding problem, however, appears to be that of discoloration of the front rods; with the hope of a three-year maintenance period from the point of view of general condition of the fire, it is essential that the appearance of the radiant shall be maintained. It is likely that the products of combustion must be completely retained inside the radiant in order to avoid discoloration, and one line of approach is to streamline the thorns of the rods so that adequate heat transfer is obtained, while avoiding a high resistance to the flow of products of combustion inside the radiant.

Flue Outlet.—Examination of present fires suggests that the designers have failed to consider the flue outlet as an integral part of the design. It is particularly important that the flue outlets on such fires as panel fires should discharge the products vertically into a precast concrete flue, thus avoiding any local hot spot. The whole question of design of the flue outlet and its relation to the top of the radiants, practical conditions of fixing, and extra excess air inlets, needs further consideration.

Emission Spectra.—Data are incomplete as to the exact spectra desirable, but it has been established that the emission spectra from a fire of reasonably constant total area, gas rate and radiant efficiency can be varied over a wide range by modifying the open area of the front or, as Hartley shows, by "doping" the refractories themselves. Tests on rod fires gave very similar efficiencies with the open area of the front fret between the limits of 20% and 35%; the fires with the smaller open area gave a much more brilliant and even appearance, an increased proportion of shorter infra red and an increased tendency to "glare" effects.

Fires of Good Appearance at Smaller Heat Output.—A new problem of gas fire design is provided by the use of these fires for topping-up purposes when background heating is already provided (a condition of domestic heating already envisaged by many authorities). The total heat output required is small, and at the moment it is difficult to envisage fires of attractive appearance giving sufficiently low heat output—*e.g.*, the average gas rate of a living-room gas fire to give topping-up in a 1,500 cu.ft. room is less than 15 cu.ft. per hour. Possible developments may be the use of reflectors, or of fires of a lower average emitting temperature with a glow given by a localized high temperature zone in order to retain the attractive appearance.

Replacing the Coal Fire.—There have always been those who find something special in the comfort given by a coal fire. A gas fire of the inset type can be designed to give a similar distribution of heat, similar ventilation and a similar emission spectra to that of a coal fire burning at its best. It is felt that this type of inset fire represents a development which would be preferred by certain people to the conventional fire, but it is unlikely that the radiant efficiency obtained will be as high as that from a conventional fire.

Ignition.—For better or for worse ignition has become a standard feature of gas fires. The main problem is one of maintenance, as lighters integral with the cock tend from their nature to be complicated, and it is not yet known if they can have a maintenance life comparable to that of other parts of the fire. It is hoped that some form of simple flint lighter can be developed which may become standard on all gas fires, even if the lighter is separated from the control cock; the main difficulty with such a design at the moment appears to be to avoid any possible "flash" if the fire is ignited carelessly. It is still hoped that a perfect "cold catalyst" will one day be available, as this would answer the requirements in the simplest possible way.

Room Heating Tests and Statistical Tests.—Tests of this type are ultimately of the greatest importance, as it is only from them that we can be certain that the trend of gas fire design is in the right direction, and only from them can be discovered the weaknesses of gas fires compared with alternative methods of heating. Emphasis must, however, be laid on the importance of applying expert statistical knowledge to the sampling and interpretation of any statistical data, as otherwise results may be misleading.

Not only is detailed information needed from the district, but prolonged tests under carefully controlled laboratory conditions are necessary to enable the designer to attach the proper value to his data on emission spectra, distribution of heat, &c.

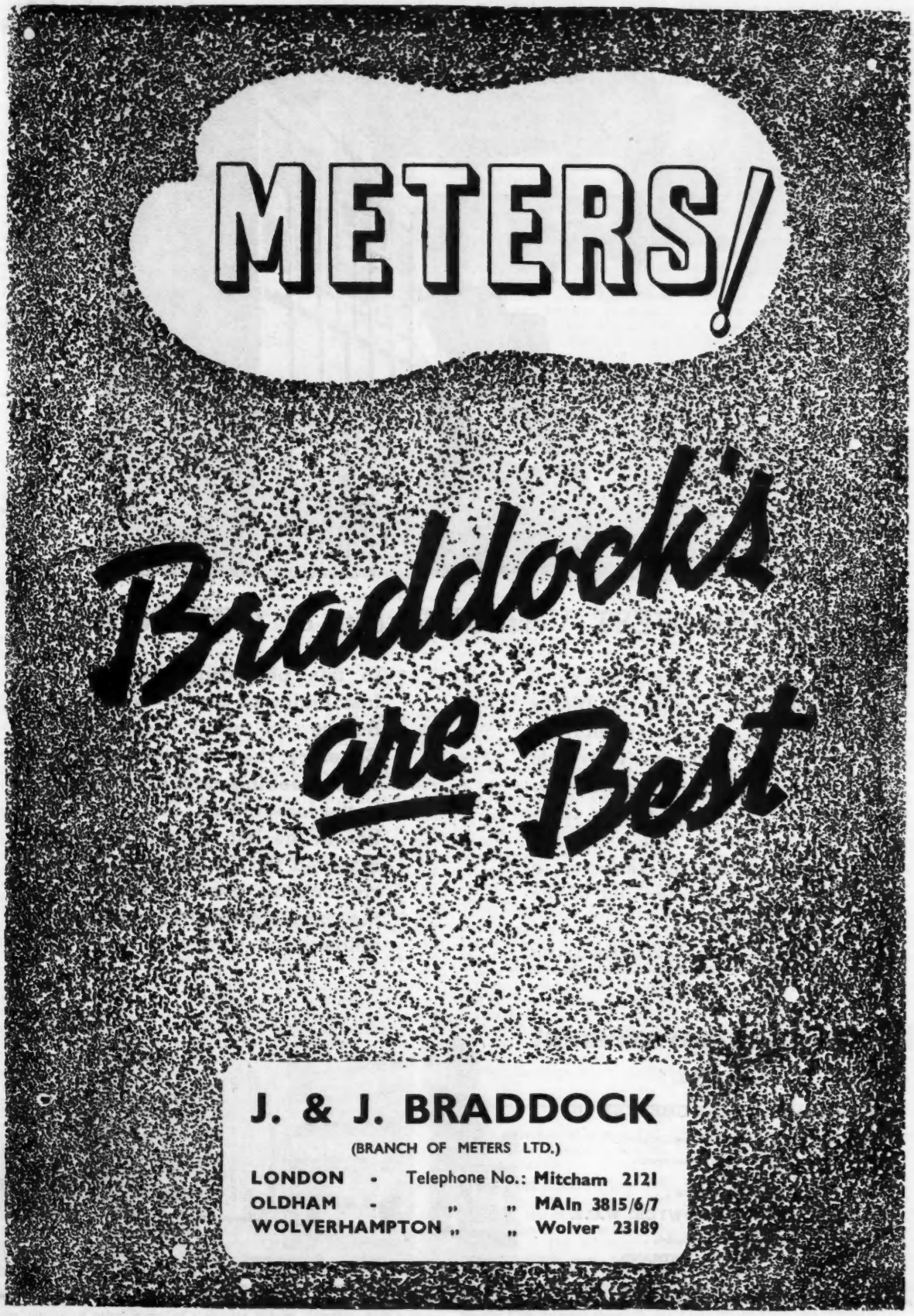
DRYING CABINETS

These have taken on an entirely new importance since the war, as indoor drying is a feature of many of the new housing plans; this results in a new opportunity and a new danger. The danger is that drying cabinets look so simple, and builders may be tempted to take an existing cabinet and insert a gas burner at the base and call it a drying cabinet. It is essential that the simple principles of design should be understood.

Theoretical Maximum Efficiency.—It is difficult to assess any theoretical maximum value because of the need to dry quickly and together many different types of clothes, the variations in washing-day technique among different people, variations in method of hanging clothes, and the need at all times to avoid such a high efficiency that condensation in the kitchen becomes likely. Until some standardization of these conditions has been agreed it seems wiser to discuss a few points of immediate practical concern in the design of drying cabinets.

The Three Parts of a Drying Cabinet.—The drying cabinet can conveniently be considered as three distinct parts: The heating unit at the base, allowing the correct heat input to the cabinet, correct distribution of warm air at the desirable temperature and avoiding scorching at any point on the base grid.

The drying rails which enable the clothes to be put in the cabinet conveniently, aid speedy drying by permitting adequate air movement

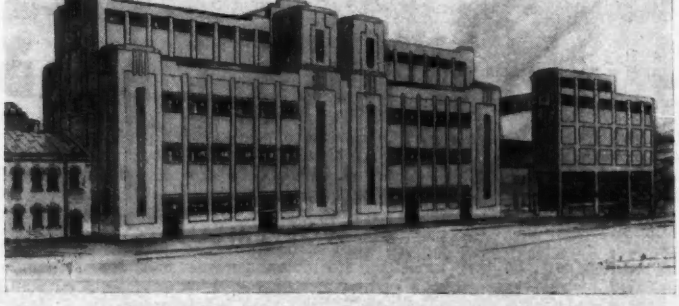

METERS!
Braddock's are Best
J. & J. BRADDOCK
(BRANCH OF METERS LTD.)
LONDON - Telephone No.: Mitcham 2121
OLDHAM - „ „ MAIn 3815/6/7
WOLVERHAMPTON „ „ Wolver 23189

GLOVER-WEST *Vertical Retorts at* COVENTRY

"It is no longer considered necessary that the buildings housing Gas Works plant should be of a purely utilitarian character. For comparatively little extra expenditure it is possible for these buildings to be of such a character as to maintain and even raise the prestige of the Gas Industry in the eyes of the consumer and of the public as a whole."

COMMUNICATION No. 230—PROCEEDINGS OF THE INSTITUTION OF GAS ENGINEERS, 1939-40.

In this photograph of the fourth Installation of Glover-West Vertical Retorts at the Foleshill Works, Coventry, the coke storage hoppers with screening plant above are seen in the foreground. The retort house lies to the left. Space between is reserved for the duplication of the carbonizing plant. The project for the complete installation is sketched below.



West's Gas Improvement Co., Ltd.

Miles Platting, MANCHESTER 10

Telephone: Collyhurst 2961-2-3-4-5.
Telegrams: Stoker, Manchester.

London Office:
COLUMBIA HOUSE, ALDWYCH, W.C.2.

Telephone: Holborn 4108-9.
Telegrams: WESGASCO, ESTRAND.

through the cabinet, and at the same time avoiding any clinging together of the hanging clothes.

Finally, the top outlet must be of suitable area and disposition to ensure adequate air flow and uniformity of air flow through the cabinet.

Heat Input.—The scorching limit gives the maximum permissible temperature inside the cabinet, but it is also essential that the heat input shall be adequate to evaporate the water from the clothes. In order to obtain a high gas rate, a high rate of air flow and therefore a low resistance inside the cabinet when loaded and adequate inlets and outlets are essential. Present cabinets operate at a thermal efficiency of about 45%.

Uniformity of Air Movement and Temperature.—This is a difficult problem, and for any shape or size of cabinet it is very much a matter of experience and trial. It can be shown, however, that the relative positions of the bottom burner, the air inlets for combustion, and the inlet for diluent air are of very great importance, and small changes can modify the temperature distribution considerably. It is essential that all tests should be carried out with the cabinet fully loaded with dry clothes.

Drying Rails.—These should be sufficiently wide so that hanging clothes do not cling together—for example, 1 in. effective diameter—and must be arranged so that a woman can easily load a batch of wet clothes, and also can readily check the progress of drying of individual garments.

Top Outlets.—These must be considered as a part of the complete ventilating system, and it is a matter of experience and trial to check that they play their part in giving uniformity of air movement.

Removal of Steamy Air.—While it is true that complaints in the past were few and could normally be explained by the use of cabinets in kitchens which were obviously badly ventilated, the modern tendency is to ask for much improved air conditions in a kitchen or utility room. It is anticipated, however, that the new ventilation standards suggested for a kitchen—viz., a 30 sq. in. flue and adequate air inlets—will deal with any steamy air from a drying cabinet. A more positive alternative method is the use of a fan at the top of a cabinet and connected direct to the outside air. This is clearly a complete answer, but limits the position of a drying cabinet, and a simpler solution is to have a flue connected to a hood immediately above the drying cabinet. An alternative which has been suggested is to use a larger canopy in the kitchen to aid the removal of steam from the wash boiler, cooker, and the drying cabinet. Technical data on such devices is lacking; at the moment one is tempted, whilst obtaining further data, to assume that conditions will be reasonably satisfactory in a kitchen providing a 30 sq. in. flue is present.

Dimensions.—The standard B.S.I. dimensions of kitchen cabinets simplify the problem of design. Two types of cabinet should, however, be considered—one to build in with standard equipment, and the other a free standing model of similar dimensions.

George Wilson Gas Meters

The Ninth Ordinary General Meeting of George Wilson Gas Meters, Ltd., was held at Coventry on Oct. 29.

Mr. W. D. Wilson, B.E.M. (Chairman and Managing Director), who presided, said: Ladies and Gentlemen, I want first of all to say how deeply I regret the untimely death of my father, James Henry Wilson, who passed away suddenly on Oct. 6, at the age of 64. He had been our Chairman and Managing Director since the incorporation of the Company in its present form in February, 1937, and had taken the chair at each of the general meetings held since that date.

Some 60 years ago my grandfather, the late Mr. George Wilson, founded the business of George Wilson Gas Meters in Holland, and in 1904 my father came to this country and opened a factory in Coventry. From that stage, when the first week's staff included only three members, the firm was built up by his inspiration, enthusiasm, and unlimited energy, until just prior to the war we employed some 600 people, with branch works at London, Manchester, Blackpool, Leeds, and Dundee.

Mr. Wilson was well known in the Gas Industry, having been a member of the Meters Committee of the Institution of Gas Engineers since 1942, a past Chairman of Section 5 of the Society of British Gas Industries, and a member of several other committees, not to mention his numerous activities in other spheres of life. He will, I am sure, be very sadly missed by his many friends, and particularly by all those who worked with him in the service of your Company.

Since 1940 we have been prohibited from mentioning or publishing any reference to war production or to war damage incidents, or any other information which might have been of some value to the enemy. Now that hostilities have happily been brought to an end, however, these irksome but necessary restrictions have been relaxed, so that I am permitted on this occasion to tell you something of the Company's wartime experiences.

In the course of the air attacks on Coventry the main factory was hit no less than four times, twice in Oct., 1940, once in Nov., 1940, and again in April, 1941. The damage to the buildings, plant, tools, and other equipment and stock-in-trade was very severe, and the rebuilding operations extended from Oct., 1940, to Feb., 1942. These repairs, however, included certain work of a temporary nature only, and the final reinstatement still remains to be done as soon as conditions permit. The air raids naturally caused a very serious dislocation of work for a time, but owing to the remarkable efforts of the staff and workpeople in spite of the most appalling conditions, we managed to carry on and eventually succeeded in getting production back to a reasonable level.

As a wartime measure it was found necessary to close down our works at Leeds and Dundee. In 1941 a dispersal factory was placed at our disposal by the Ministry of Aircraft Production at Rushden, Northamptonshire, and in 1942 an extension to the Coventry factory was built for the purpose of carrying out the repair of aircraft components. In addition to repair work, the company has been engaged, at Coventry and Rushden on the manufacture of a wide range of components, parts and assemblies, under Government contracts and sub-contracts. We have repaired approximately 9,000 aircraft fuel and oil tanks and numerous other components, while the following examples of our war production may be of interest to you: Over 1,000,000 high tensile steel bolts, over 3,000,000 percussion fuses, 176,000 Bangalore torpedoes, 219,000 smoke bomb adaptors, 76,000 hand grenades, 80,000 star shells, 40,000 tail propelling rockets, 28,000 element channels, 14,500 gun and access doors, 1,000 Spitfire tanks, 400 pilot seats, 200 sets of Dominie engine cowlings, and a large variety of other items of a similar nature, together with a considerable amount of experimental work. In view of the handicaps resulting from the attacks of the enemy, I feel that you may regard your company's contribution to the war effort as having been not altogether unworthy.

Our wartime activities, however, are now coming to an end, and we are taking energetic steps to obtain our proper share of the vast amount of work which is waiting to be done in connexion with the national housing problem and the revival of export trade which is so urgently needed. We have also acquired, since the date of the balance-sheet before you, a part interest in a firm engaged in the distribution of gas appliances which, it is expected, will open up fresh fields of manufacture for your company.

Meanwhile a number of our Government contracts have been and are being cancelled, and it is unfortunately apparent that the period of transition from war to peacetime production will present a great many difficulties. These will be faced by your Company with the utmost enterprise and determination, but the speed with which they are overcome will depend very largely on Government policy and other factors over which we have no control. It may, in fact, well be that the Company will have to consider the possibilities of manufacturing in other parts of the country.

You will no doubt have observed, in the section of the balance-sheet headed "Fixed Assets," several references to fire damage, of which you will require some explanation. In May, 1944, the garage premises at Coventry in which we were interested were completely gutted by fire, resulting in the loss of certain vehicles and equipment. Less than a week afterwards another fire broke out at our London works, causing considerable damage to the buildings, plant, and stock-in-trade, and consequent disorganization of production until repairs had been effected. The insurance claims arising out of these unfortunate incidents have in the main been agreed and settled, and the balance-sheet values of the assets concerned have been appropriately adjusted.

Over 100 of our employees have been serving in H.M. Forces, and have earned our undying gratitude for the sacrifices they have made. Unfortunately in one case the supreme sacrifice was paid. I would like it to be known that it is our earnest desire, where practicable, to reinstate these people on demobilization.

I should like to take this opportunity of thanking my co-directors and all the employees of the Company at Coventry, and at each of the branches, for their work and co-operation throughout the year.

The report and accounts were adopted, and the proposed dividend of 7½%, less income tax, on the Ordinary shares, was approved.

The retiring director, Mrs. I. R. Amor, was re-elected, and the retiring Auditors, Messrs. Daffern & Co., Coventry, were reappointed.

The Directors of Meters, Ltd., Manchester, have declared an interim dividend of 4% actual, less tax, on Ordinary stock for the half-year ended Sept. 30.

The 1945 Edition of the Coke Oven Managers' Association Year Book, the 26th of the series, forms a convenient record of the Association's transactions during 1944, when members were already looking forward to the tasks which would await them after the end of hostilities. The Editorial Committee reports good progress; sectional meetings were well attended, and many technical Papers of interest and value to the coking industry were presented. Co-operation with research organizations continued, and representatives of the Association took part in the post-war programmes in preparation by the Government through the Ministry of Fuel and Power.

GAS STOCKS AND SHARES

Markets were fairly active at the opening last week, though prices were inclined to lose some of their buoyancy by reason of political uncertainties, each day seeing further fractional losses, especially among the Funds. There were a few good industrial features, however, especially among Brewery shares, and at the close Cable and Wireless preference made a big jump on the nationalization news.

The Gas Market remained quiet with very little support, and it will be seen that during the week very few changes in price were recorded. The quotations shown in the tables below in the Official and Supplementary Lists were those on November 1, and compared with a month ago the number of alterations either way has been on a smaller scale than for some time past. The movements were not large either way, the most noticeable being Gas Light units with a gain of 2s. and South Metropolitan Ordinary which rose 6 points on the month.

The following price changes occurred last week:

OFFICIAL LIST

Associated Gas & Water Ord. (x.d.)	21/9—22/9	Oct. 29
Ditto Deferred (x.d.) ...	22/—23/—	"
Cape Town 4½ p.c. Cum. Pref. (x.d.)	12/—14/—	Oct. 22
Gas Consolidation Ord. "B" ...	22/—23/—	—3d.
Gas Light 3½ p.c. max.	80—85	+2
Imperial Continental Ord.	118—123	−2
South Metropolitan Ord.	92—95	+1

PROVINCIAL EXCHANGE

Bristol 5 p.c. max.	117½—119½	+1½

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends Interest. Amnt. or Rate% Prev. Hf. Yr. Actual.	Dividends Interest. Amnt. or Rate% Last Hf. Yr. Actual.	NAME	Quotations Nov. 1
1,767,439	Sept. 10	20/–	30/–	Alliance & Dublin Ord. ...	115—120
900,018	Oct. 29	6d.	6d.	Asscd. Gas & Water U'd'ts Ord.	21/9—22/9
389,000	"	7½d.	7½d.	Do. Deferred	22/—23/—
500,000	Sept. 3	2½	2½	Do. 4½ p.c. Red. Cum. Pref.	21/—22/—
536,000	"	2	2	Do. 4 p.c. Red. Cum Pref.	20/—21/—
342,000	"	2	2	Do. 4 p.c. Irred. Cum. Pref.	19/3—20/3
561,370	Aug. 20	70/–	70/–	Barnet Ord. 7 p.c.	159—164
300,000	June 11	8¾d.	10¾d.	Bombay, Ltd.	42/—45/—
690,526	Aug. 13	70/–	70/–	Bournemouth 7 p.c. max. ...	155—160
362,025	June 11	2	2	Do. 4 p.c. Deb. ...	102—107
659,955	Sept. 10	57/–	41/–	Brighton, &c., 5 p.c. Con. ...	107—112
855,000	" 24	60/–	60/–	Brit. Gas Light Ord.	120—125
545,000	June 25	2½	2½	Do. 5½ p.c. 'B' Cum. Pref.	115—120
120,000	" 18	2	2	Do. 4 p.c. Red. Deb.	95—100
100,000	Oct. 22	4/6	2¼	Cape Town, Ltd., 4½ p.c. Cu. Pf.	12/—14/—
626,860	July 16	70/–	50/–	Cardiff Con. Ord.	120—125
24,500	June 4	8½d.	8½d.	Colombo 7 p.c. Pref.	23/6—25/6
764,169	Sept. 24	4.78d.	6d.	Colonial Gas Assn. Ltd. Ord. ..	16/6—18/6
400,000	"	7.649d.	9¾d.	Do. 8 p.c. Pref. ...	22/—24/—
1,748,090	July 22 '40	30/–	30/–	Commercial Ord.	60—65
620,000	June 4	1½	1½	Do. 3 p.c. Deb.	74—79
286,344	Aug. 27	2½	2½	Do. 5 p.c. Deb.	114—119
807,560	" 20	60/–	60/–	Croydon sliding scale	122—127
644,590	"	50/–	50/–	Do. max. div.	104—109
620,385	June 25	2½	2½	Do. 5 p.c. Perp. Deb. ...	123—128
179,500	Aug. 27	50/–	50/–	East Surrey 'B,' 5 p.c.	102—107
176,461	June 25	2½	2½	Do. 5 p.c. Deb. (Irred.)...	122—127
239,135	Sept. 17	6d.	7½d.	Gas Consolidation Ord. 'A' ...	22/—23/—
250,000	"	4½	4½	Do. Ord. 'B' ...	22/—23/—
250,000	May 7	2	2	Do. 4 p.c. Red. Cum. Pref.	18/6—20/6
19,101,827	July 30	6d.	6d.	Gas Light & Coke Ord. ...	22/9—23/9a
2,600,000	"	35/–	35/–	Do. 3½ p.c. max.	80—85
4,477,106	"	2	2	Do. 4 p.c. Con. Pref. ...	101—104
2,993,000	July 16	1½	1½	Do. 3½ p.c. Red. Pref. ...	100—103
8,602,497	May 28	1½	1½	Do. 3 p.c. Con. Deb. ...	89—92
3,642,770	"	2½	2½	Do. 5 p.c. Red. Deb. ...	106—109
3,500,000	"	2½	2½	Do. 4½ p.c. Red. Deb. ...	107—110
700,000	Sept. 17	1¾	1¾	Do. 3½ Red. Deb. ...	98—100
5,600,000	May 28	—	†£10	Imperial Continental Cap. ...	118—123
43,340	July 30	1¾	1¾	Do. 3½ p.c. Red. Deb. ...	97—100
2,167,410	Aug. 7	60/–	55/–	Liverpool Ord.	123—128
231,978	" 13	50/–	50/–	M.S. Utility 'C' Cons.	108—113
850,000	"	2	2	4 p.c. Cons. Pref.	100—105
675,000	April 30	‡40/–	‡40/–	Montevideo, Ltd.	115—120
300,000	" 23	£6	£4	Oriental, Ltd.	195—205
368,537	June 11	50/–	57/6	Plymouth & Stonehouse 5 p.c.	110—115
621,667	Aug. 13	72/6	72/6	Portsmouth & Gosport Cons.	155—160
2,386,371	July 9	†9¾d.	†9¾d.	Primitiva Holdings, Ltd. Ord.	13/—14/—
226,860	June 11	3	3	Do. 6½ p.c. Red. Cum. Pref.	102—107
648,999	Sept. 10	6¾	6¾	Severn Val. Gas Cor. Ld. Ord.	23/—24/—
597,972	"	2¼	2¼	Do. 4½ p.c. Cum. Pref. ...	22/—23/—
2,528,714	Aug. 27	6d.	3½d.	South East'n Gas Cn. Ld. Ord.	20/—21/—
1,000,000	"	2¼	2¼	Do. 4½ p.c. Red. Cum. Pref.	21/3—22/3
1,068,869	"	2	2	Do 4 p.c. Irred. Cum. Pref.	19/9—20/9
6,709,895	Aug. 20	†40/–	30/–	South Met. Ord.	92—95
1,135,812	"	3	3	Do. 6 p.c. Irred. Pref. ...	125—130
850,000	"	2	2	Do. 4 p.c. Irred. Pref. ...	100—103
1,895,445	July 2	1½	1½	Do. 3 p.c. Perp. Deb. ...	88—91
1,000,000	" 16	2½	2½	Do. 5 p.c. Red. Deb. ...	102—107
1,543,795	July	50/–	50/–	South Suburban Ord. 5 p.c ...	113—118
512,825	"	2½	2½	Do. 5 p.c. Perp. Pref. ...	111—116
500,000	"	2	2	Do. 4 p.c. Perp. Pref. ...	99—104
250,000	"	1¾	1¾	Do. 3½ p.c. Red. Pref. ...	93—98
888,587	June 11	2½	2½	Do. 5 p.c. Perp. Deb. ...	122—127
750,541	Aug. 13	50/–	50/–	Southampton Ord.	108—113
350,000	" 13	2½	2½	Swansea 5½ p.c. Red. Pref. ...	105—110
1,076,490	" 7	50/–	50/–	Tottenham & District Ord. ...	113—118
338,555	"	2½	2½	Do. 5 p.c. Pref.	111—116
453,380	June 11	2	2	Do. 4 p.c. Perp. Deb. ...	100—105
1,483,664	"	7½d.	6d.	U. Kingdom Gas Cor. Ord. ...	20/9—21/9
1,085,952	May 14	5¾d.	5¾d.	Do. 4½ p.c. 1st Cum. Pref. ...	21/6—22/6
772,709	"	4¾d.	4¾d.	Do. 4 p.c. 1st Red. Cum.Pref.	19/9—20/9
745,263	June 18	5¾d.	5¾d.	Do. 4½ p.c. 2nd Non.Cum. Pf.	20/6—21/6
1,200,000	Sept. 17	1¾	1¾	Do. 3½ p.c. Red. Deb. ...	97—102
380,608	Aug. 13	66/3	66/3	Uxbridge, &c., 5 p.c.	124—129
1,371,138	July 30	50/–	50/–	Wandsworth Consolidated ...	113—118
2,525,768	"	2	2	Do. 4 p.c. Pref.	101—104
1,343,964	June 18	2½	2½	Do. 5 p.c. Deb.	122—127
383,745	"	2	2	Do. 4 p.c. Deb.	100—105
558,342	Aug. 13	50/–	50/–	Watford & St. Albans Ord. ...	114—119

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends Interest. Amnt. or Rate% Prev. Hf. Yr. Actual.	Dividends Interest. Amnt. or Rate% Last Hf. Yr. Actual.	NAME.	Quotations Nov. 1
351,685	June 18	2½	2½	Brighton, &c., 5 p.c. Perp. Deb.	122—127
415,250	"	2	2	Bristol Gas Co., 4 p.c. New Deb.	101—104
140,205	July 30	70/–	70/–	Cambridge, &c., 7 p.c. Cons. 'B'	141—146
295,932	Aug. 20	50/–	50/–	Cheltenham, 5 p.c. Cons.Ord....	107—112
42,500	June 18	2	2	Do. 4 p.c. Perp. Deb....	100—105
150,000	Aug. 20	2	2	Croydon Gas, 4 p.c. Pref. (Irr.)	98—103
130,000	June 25	2	2	Do. 4 p.c. Deb. ...	100—105
53,220	Aug. 27	3	3	East Surrey, 6 p.c. Cum. Pref....	127—132
...	Aug. 19 '40	40/–	40/–	Eastbourne, 'B' 3½ p.c.... ...	97—102
117,425	March 1	—	£6	East Wight Cons. 5 p.c. ...	100—105
25,000	June 18	2½	2½	Guildford 4½ p.c. Red. Deb. ...	100—105
156,600	Aug. 13	50/–	50/–	Hampton C't, 5 p.c. Cons. Ord.	114—119
18,000	May 28	—	£7	Malta & Med'n., 7 p.c. 1st Pref.	90—100
10,845	"	—	£7½	Do. 7½ p.c. 2nd Pref.	90—100
50,000	Aug. 13	52/3	52/3	Mid. South. Util., 'A' Cons. 5 p.c.	107—112
70,380	June 25	2½	2½	Newport (Mon.), 5 p.c. Deb....	120—125
65,000	Aug. 13	2½	2½	North Middlesex, 5 p.c. Pref....	110—115
70,000	Sept. 10	2½	2½	Plymouth & Stone., 5 p.c. Deb.	120—125
76,501	June 18	2	2	Reading, 4 p.c. Perp. Deb. ...	100—105
74,777	Oct. 1	2	2	Romford, 4 p.c. Debs. (Reg.) ...	98—103
21,000	June 11	2¼	2¼	Slough, 5 p.c. Perp. Deb. ...	122—127
211,740	" 18	2½	2½	Southampton, 5 p.c. Red. Deb.	105—110
363,575	July 2	2½	2½	Tottenham, 5 p.c. Reg. Red. Mt.	99—102
202,019	Sept. 24	75/–	75/–	Tunbridge Wells, 4 p.c. Scale ...	140—145
135,257	June 11	2½	2½	Uxbridge &c., 5 p.c. Perp. Deb.	122—127

PROVINCIAL EXCHANGES

					Quotations Oct. 27
804,948	Aug. 7	2½	2½	Bath Cons.	113—115
122,577	Aug. 20	4½	3	Blyth 5 p.c. Ord.	124—126
1,667,250	July 16	2½	2½	Bristol, 5 p.c. max.	117½—119½
120,420	June 18	2	2	Do. 1st 4 p.c. Deb.	102—104
415,250	"	2	2	Do. 2nd 4 p.c. Deb.	101½—103½
328,790	"	2½	2½	Do. 5 p.c. Deb.	122—124
157,150	Aug. 7	3½	2½	Chester 5 p.c. Ord.	115—117
52,500	June 18	2	2	Do, 4 p.c. Cum. Pref. ...	99—101
40,000	"	2	2	Do. 4 p.c. Non. Cum. Pref.	99—101
36,430	"	1½	1½	Do. 3½ p.c. Deb.	88—92
41,890	"	2	2	Do. 4 p.c. Red. Deb. ...	100—102
542,270	Feb. 12	3	4½	Derby Cons.	135—140
55,000	June 18	2	2	Do. 4 p.c. Deb.	97—102
40,000	Aug. 7	5½	5½	Exeter 10 p.c.	185—195
10,000	" 13	5	5	Great Grimsby 'A' Ord. ...	175—185
6,500	"	5	5	Do. 'B' Ord. ...	175—185
79,000	"	5	5	Do. 'C' Ord. ...	165—175
732,000	Aug. 27	2	2	Hartlepool G. & W. Cn. & New	91—93
490,681	June 18	1½	1½	Liverpool 3½ p.c. Red. Deb. Stk.	95—100
245,500	"	2	2	Do. 4 p.c. Red. Deb. Stk.	102—103
306,083	July 2	2	2	Do. 4 p.c. Deb.	103—105
680,000	June 4	2½	2½	Do. 5 p.c. Red. Stk. ...	104—109
20,000	"	2½	2½	Long Eaton 5 p.c. Pref.	9—11
80,000	"	2½	2½	Do. 5 p.c. Deb.	117—122
2,430,267	Aug. 7	2½	2½	Newcastle and Gateshead Con.	24/9—25/3a
682,856	"	2	2	Do. 4 p.c. Pref.	102—104
776,706	June 25	1½	1½	Do. 3½ p.c. Deb.	100½—102½
250,000	"	1½	1½	Do. 3½ p.c. Red. Deb. ...	100—102
73,186	Oct. 29	2	2	Do. 4 p.c. Red. Deb. ...	102—104
106,280	Aug. 13	5	5	Preston 'A' 10 p.c.	195—200
188,219	"	3½	3½	Do. 'B' 7 p.c.	145—150
1,806,339	Aug. 27	3½	3½	Sheffield Cons.	143—147
95,000	July 30	2	2	Do. 4 p.c. Deb.	98—102
332,351	Aug. 13	3	3	Sunderland 6 p.c. max. ...	123½—125½
192,150	" 13	2½	2½	Weston-super-Mare Cons. ...	112½—114½
64,338	July 2	2	2	Do. 4 p.c. Deb.	99—101
33,340	"	3½	3½	Do. 7½ p.c. Deb.	145—150

a.—The quotation is per £1 of Stock. * Ex. div. † For year. ‡ Paid free of income-tax.

GAS PRODUCTS PRICES

The London Market Nov. 5.

There are no changes to report in the prices of Coal Tar Products.

There have been two developments of interest in connexion with Coal Tar Products, the first being the cancellation of Government contracts for toluene, and the second the issue of the Control of Benzole and Allied Products Order, 1945 (S. R. & O. 1945, No. 1064), which came into force on Sept. 1 and brings all Coal Tar Spirits under one and the same Order.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S. R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

The Provinces Nov. 5.

The average prices of gas-works products during the week were : Pitch and Crude Tar,* Toluole, naked, North, 90's. 2s. 4d. to 2s. 6½d., pure, 3s. 2½d. Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland Nov. 3.

Inquiries are numerous with prices firm. Refined tar*: Yield to distillers is 5d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7½d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 7d. to 8d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 10d., and 90/190 Heavy naphtha, Unrectified, 2s. 0½d.; Rectified, 2s. 4d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

Address your orders and enquiries for
HUMIDINE
The unique anti-corrosion paint for gasholder cuppings, etc.
To the sole manufacturers:
ASPINALLS (PAINTS) LIMITED
GARLETON — SKIPTON — YORKS

TULLY SONS & CO. LTD.
Millgate, Newark-on-Trent. T/N Newark 258. T/A Tullcarbo Newark.
The PATENT Mechanically Operated
TULLY GAS PLANT
with Waste Heat Boiler for the
ONE STAGE GASIFICATION OF COAL

PECKETT & SONS LTD.
Atlas Locomotive Works, St. George, Bristol 5. T/N Fishponds 53006. T/A Peckett, Bristol. London Representatives: Ferguson & Palmer, 9, Victoria Street, S.W. 1.
LOCOMOTIVE ENGINEERS.

TOM CARRINGTON & CO. LTD.
Lyndon Toolworks, West Bromwich. T/N 0517 (2 lines).
"LYNDON" and "EGA-KUT"
SCREWING TOOLS;
TAPS; DIES; STOCKS AND DIES;
GROUND THREAD TAPS

COX & DANKS LTD.
DEMOLITION & DISMANTLING ENGINEERS.
IRON & STEEL SCRAP CLEARANCE.
SWANSEA - BEDFORD - COVENTRY.

LEONARD BOTT LIMITED
Holyhead Road, Wellington, Shropshire.
T/A Leonardbot, Wellington, Salop. T/N Wellington Salop 320.
GASHOLDERS
INSPECTED
Repairs and New Work Supervised.

ESCOL
THE SYMBOL OF SERVICE AND QUALITY
VITREOUS ENAMELS
Telegrams: Escol, Toot, London
Telephone: Mitcham 1634 (5 lines)
STEWART & GRAY LTD.
Paisley Works, Swains Road
Tooting Junction, S.W.17.

A. G. SUTHERLAND LTD.
Warwick Road, Greet, Birmingham. T/N Victoria 2184-5. T/A Metriform, Birmingham. London: Riverside Road, S.W. 17. T/N Wimbledon 5454. T/A Insituslot, Toot, London, and at Salford and Nottingham.
GAS METERS

NATIONAL ENAMELS LTD.
53, Norman Road, Greenwich, London, S.E.10. T/N Greenwich 2266-7.
Our COOKER LININGS, CROWN TRAYS and SPLASHBACKS have been well proved by the Gas Industry.

CHARLES WINN & CO., LTD.
Granville Street, Birmingham, 1. T/N Midland 3695 (4 lines). T/A Winn, Birmingham.
BACK PRESSURE GAS VALVES, SIZES 1 in. to 12 in. FOR USE WITH AIR BLAST IN INDUSTRIAL AND OTHER GAS-HEATED APPARATUS.

HENRY BALFOUR & CO. LTD.
GAS, CHEMICAL and GENERAL ENGINEERS and IRONFOUNDERS,
Durie Foundry, LEVEN, Fife.
T/A Foundry, Leven, Fife. T/N Leven 79 (4 lines).

Arkon
INSTRUMENTS
Gas Flow Recorders and Indicators
Pressure and Vacuum Recorders and Indicators
Full Scale or Inclined Gauges
WALKER, CROSWELLER & CO. LTD.
CHELTENHAM, GLOS. Cheltenham 5172

JAMES WALKER & CO. LTD.
"Lion" Works, Woking, Surrey. T/N Woking 2432. T/A Lioncelle, Woking.
"LION" Packings and Jointings for every Industry. We solve modern packing and jointing problems—it is our sole business.

GEORGE WALLER & SON LTD.
Phoenix Iron Works, Stroud, Glos. T/N Brimscombe 2210. T/A Waller, Stroud.
Specializing in GAS EXHAUSTING MACHINERY, GAS COMPRESSOR and BOOSTING PLANT, GAS GOVERNORS, GAS VALVES, COKE BREAKERS, PAN ASH SEPARATORS.

WM. PRESS & SON.
38, Old Queen Street, London, S.W. 1. T/N Whitehall 1752, 2961. T/A Unwater, Parl.
CIVIL ENGINEERING CONTRACTORS
Depot phones for Emergency Work (Day and Night): TOTtenham 2665-6 ; ADVance 3771 ; LIBerty 3229.

UNDERPRESSURE ENGINEERING CO., LTD.
UNION FOUNDRY, MANSFIELD, NOTTS.
NORFOLK HOUSE, NORFOLK STREET, STRAND, W.C.2
UNDERPRESSURE CONNECTIONS
SPLIT COLLARS
SOCKET CLIPS
CENTRAL ACTION DRILL STANDS
SERVICE CLEANSERS
TOOLS, ETC.
NOTICE OF OPENING OF LONDON STOREHOUSE AT
VALE ROYAL, KING'S CROSS, W.C.2
Everything for Gas and Waterworks Maintenance

THOMAS BUGDEN & CO.

India-Rubber and Airproof Manufacturers and General Contractors.

LARGEST MANUFACTURERS OF GAS MAIN BAGS.

Telegrams—"Airproof, Barb., London." Telephone—5147 Clerkenwell

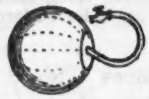
Contractors to H.M. Government.

Gas Bags for Repairing Mains.

PATENTEES OF THE

DENMAR BAG

Impervious to Main Liquor and Climatic Influences.



Round or Cylinder Shape.

Contractors' & Miners' Woollen Jackets, Trousers, Hats, &c.

Pull-through and Expanding MAIN STOPPERS.

All types of INDIA-RUBBER BOOTS.

DRAIN RODS AND WHALE-BONE BRUSHES

HOSE AND TUBING FOR ALL PURPOSES.

Stokers' Mitts and Gloves of every description

244, Goswell Road, LONDON, E.C.1

EWART CHAINBELT CO., LTD.

DERBY, ENGLAND

Driving and Conveyor Chains of the best quality; made of Ley's Celebrated Blackheart Malleable Iron.

ALSO COMPLETE CONVEYORS AND ELEVATORS

CASES FOR BINDING

Half-Yearly Volumes of the "Gas Journal."

5/- each, post free.

Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

CONVEYORS,
ELEVATORS,
BUNKERS, ROOFS,
HOISTS, Etc.

GOODALL, CLAYTON & CO. LTD. LEEDS.

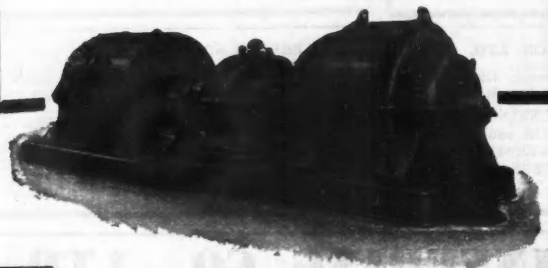
COAL AND COKE SCREENING & SIZING PLANTS.

RETORT SETTINGS
PRODUCERS, FURNACES
REPAIRS.

TURBO-COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.

* * *

We build a complete range of Compressors & Exhausters for air and GAS, suitable for all purposes connected with the Gas Industry, including Turbo Compressors for large capacities, as illustrated below.



WRITE FOR PAMPHLET No. 1018 GIVING PARTICULARS—

REAVELL & CO., LTD.,
RANELAGH WORKS, IPSWICH.

Telegrams: REAVELL, IPSWICH. Telephone: 2124 & 5.

BEWARE of THE IGNITION IMP alias the TOOL SPARK

End the tool spark fire and explosion danger in hazardous industries by using TELCON SAFETY TOOLS. Made from Beryllium-Copper Cu-Be 250—a non-ferrous alloy of exceptional strength and hardness—these tools give service comparable with steel but practically eliminate sparking dangers. All types of hand tools are available.

TELCON
Beryllium Copper Cu-Be 250 Non-Sparking
SAFETY TOOLS

Manufactured by:
THE TELEGRAPH CONSTRUCTION & MAINTENANCE CO. LTD.
Founded 1864
Head Office: 22 OLD BROAD STREET, LONDON, E.C.2. Tel: LONdon Wall 3141
Write for details to the Sole Distributors:
BERYLLIUM & COPPER ALLOYS LTD., 39 Victoria St. SW1 *Tel: ABBey 6259*

STABILIZED LIME SOFTENING

Filtrol Lime-Soda Water Softening Plant treating 4,500 galls./hr. for boiler feed.

★ **Our latest lime-soda and lime-zeolite water softening plants for boiler feed incorporate our special stabilization process for the control of alkalinity to prevent after-precipitation and caustic embrittlement. Technical literature available on request.** ★

Also: Filtrol base exchange water- softening plant : Continuous blowdown equipment : Filtrator colloidal process—feed-water conditioning, and prevention of oxygen corrosion in high-pressure boilers : Electrical de-oiling plant : Filtration plant : Chemical dosing gear : Chlorinating equipment : etc.

We are glad to analyse samples of every type of water supply and submit suggestions for its correct treatment without obligation.

Full details from:

FILTRATORS

LIMITED

Water Treatment Engineers

320 HIGH HOLBORN · W.C.1 · HOLborn 3362/3

Fuel Saving

A direct way of reducing the Fuel Consumption of Industry is to make fuller use of the heat expended on primary processes by practising Waste Heat Recovery by means of steam raising.

Spencer-Bonecourt's contribution to the National Effort is a very real one: Spencer-Bonecourt Waste Heat Boilers are effecting fuel savings to the order of some Two Million tons per annum—and there is still plenty of scope for more plants.

May we investigate the potentialities offered for fuel-saving in *your* Works?

SPENCER-BONECOURT LTD

CAMBRIDGE ROAD, HITCHIN, HERTS.

(A subsidiary of Babcock & Wilcox, Ltd.)

TANKS.

Seven storage tanks of welded construction, each 10,000 gallons capacity, 8 ft. 6 in. diameter, 30 ft. long, against one contract. Our Steel Constructional Department offers you expert advice and service on all constructional problems.

WIDNES FOUNDRY & ENGINEERING CO LTD

Specialists in all types of Pre-fabricated Steelwork and Tanks

WORKS: WIDNES, LANCS London Brettenham House W.C.2 Temple Bar 9361

60% Sulphur absorbed by our

OXIDE

which has stood the test of 60 years.

Minimum Costs, Highest Efficiency

ESTABLISHED 1873

GAS PURIFICATION & CHEMICAL COMPANY LIMITED

PALMERSTON HOUSE, 34, OLD BROAD STREET LONDON, E.C.2.

Telegrams: "Purification, Stock, London." Telephone: London Wall 5377

MAINLAYING

E. E. JEAVONS & CO., LTD., Gas Engineers and Mainlayers, TIPTON, STAFFS.

PATENTS

MEWBURN, ELLIS & CO., CHARTERED PATENT AGENTS AND TRADE MARK AGENTS

70 & 72, Chancery Lane, London, W.C.2.

Telegrams: "Patent, London." 'Phone: Holborn 0437

And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

BOG ORES

IRISH

BELGIAN and DUTCH

HARRISONS (LONDON) LTD.

66, MARK LANE, LONDON, E.C. 3

Telegrams: "BIRCHROOK, LONDON." Telephone: ROYal 3120.

EDUCATIONAL

ENGINEERING CAREERS AND QUALIFICATIONS

Both Government and Industry announce and emphasize that young men with technical knowledge and qualifications are to have every chance of rising to the highest posts within their capacity in post-war engineering and allied industry.

Write to-day for "The Engineer's Guide to Success"—200 courses—free—which gives the regulations governing qualifications such as A.M.I.Gas E., A.M.I.Chem.E., A.M.Inst.C.E., A.M.I.Mech.E. A.M.I.E.E., C. & G., etc., and contains the widest choice of engineering courses in the world; the Department of Fuel and Chemical Technology covers Gas Supply, Gas Engineering, Gas Power, Chemical Processes, etc. The T.I.G.B. guarantees training until successful and Home-study students of the T.I.G.B. have gained 44 FIRST PLACES in the examinations of the major engineering institutions.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN

148, TEMPLE BAR HOUSE, LONDON, E.C.4

MISCELLANEOUS

LARGE quantities of good rough Breeze required by factors paying own Railway Tolls. Price and particulars to No. 9378, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

"KLEENOFF"

—THE COOKER CLEANER

Tins for Sale to Consumers. In Bulk for Works Use

OXIDE OF IRON.

BALE & CHURCH, LTD.

33, ST. MARY AT HILL, LONDON, E.C.3.

Telephone: Mansion House 1156. Telegrams: "Balefire, London."

PLANT &c.

FIRTH BLAKELEY, SONS & CO., LTD. Vulcan Ironworks, Church Fenton, Yorks.

MANUFACTURERS of Gas-holders, Tanks, Condensers, Purifiers, Scrubbers, Washers, and every description of Gas Plant.

Sole Makers of the "P.M" semi-water Gas Plant.

Telegrams: "Blakeleys, Church Fenton."

Telephone: Barkston Ash 234 and 235 (Private Branch Exchange). Code: "Bentleys."

ROBERT DEMPSTER & SONS, LTD., ELLAND, Builders of CARBONIZING PLANTS, both Horizontal and Vertical. Manufacturers of CONDENSERS, PURIFIERS, GAS-HOLDERS, &c., also every description of COAL and COKE HANDLING PLANT. Telegrams: "Dempster, Elland." Telephone: Elland 2241 2242 and 2243.

THE "FLUXITE QUINS" AT WORK

Cried EH, "What's wrong with our lad?"
"In a fix," replied EE, "Pretty bad,
He was there with FLUXITE
Soldered up, good and tight,
Fair wrapped up in his work, be' gad!"

For all SOLDERING work—you need FLUXITE—the paste flux—with which even dirty metals are soldered and "tinned." It does not "poison" the solder nor corrode the metal—and can be used with safety even on sensitive apparatus.

With Fluxite, joints can be "wiped" successfully that are *impossible by any other method.*

FLUXITE has been used for over 30 years in Government Works and by the leading Engineers and Manufacturers. OF ALL IRONMONGERS—in tins—8d., 1s. 4d., and 2s. 8d. Ask to see the FLUXITE POCKET BLOW LAMP, price 2s. 6d.

The FLUXITE GUN puts FLUXITE where you want it by a simple pressure. Price 1s. 6d. or filled 2s. 6d.

ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES *ALL* SOLDERING

Write for Leaflets on CASE HARDENING STEEL and TEMPERING TOOLS with FLUXITE also on "WIPED JOINTS." Price 1d. each.

Fluxite Ltd. (Dept. G.J.), Bermondsey Street, S.E.1

TROTTER, HAINES & CORBETT LIMITED

FIRE-CLAY & BRICKWORKS STOURBRIDGE

GAS RETORTS in BEST STOURBRIDGE QUALITY also SILICIOUS QUALITY 81% SILICA

HIGH GRADE INSULATING QUALITY FIREBRICKS

REGENERATIVE TUBES & TILES

STRACHAN & HENSHAW LTD.

BRISTOL.

MANUFACTURERS and CONTRACTORS for

HANDLING PLANT

SCREENS, TIPPLERS, ETC.

REPAIR WORK

STREET LIGHTING

COMPLETE Overhaul of Automatic Gas Controllers. State make and type. Quotations free on application to Geo. F. Hutchinson, M.B.H.I., 36, Lee Lane, Horsforth, near Leeds.

CLOCKWORK Controllers for Public Lighting Control and Time Switches, Clocks and all type of instruments and appliances operated by Clockwork Repaired, Overhauled and Guaranteed. Inquiries welcomed. J. W. & R. E. Hughes (Clockwork Engineers), 58, Victoria Street, London, S.W. 1. ('Phone Victoria 0134.)

PLANT &c. FOR SALE & WANTED

'PHONE 98 STAINES.

FOR SALE.—24 ft. by 9 ft. and 17 ft. by 6 ft. Cylindrical Tanks; Thompson Lancashire Boiler 24 ft. by 7 ft., 120 lb.; 34 kw. Browett 220 volt Steam Generating Set; Weir Feed Pump 8¼ in. by 6 in. by 18 in.; Tangye 3-Throw Hydraulic Pump 3¾ in. by 6 in.; Receiver 30 ft. by 7 ft. dia., dish ends ½ in. plate.

HARRY H. GARDAM & CO., LTD., STAINES.

FOR SALE.—ONE Sturtevant No. 8 GAS PRESSURE RAISER, capacity 500,000 cu.ft. per hour, pressure differential 20 in. w.g., belt drive.

ONE No. 7 Keith Blackman GAS BLOWER, capacity 500,000 cu.ft. per hour, pressure differential 20 in. w.g., direct coupled to 25 h.p. LO-thermo Electric Motor by Messrs. Electro Motors Ltd., Manchester, 200 volts D.C. compound wound, R.P.M. 1,200/1,800. Starter Brookhirst, Type D. 25 h.p.

For further particulars apply to the General Manager and Chief Engineer, Sheffield and District Gas Company, Commercial Street, Sheffield, 1.

FOR SALE.—2 PURIFIERS by Walker, about 750,000 per day dry Lute.

1 GAS ENGINE-GENERATOR, 55 Kw., 220 volt, DC, driven by National Engine about 80 h.p., like new.

1 Steel Plated HOPPER, covered top, 24 ft. by 8 ft. by 8 ft.

Mayer Newman & Co., Ltd., Arundel House, Arundel Street, London W.C. 2.

WANTED.—Portable Screening and Bagging Plant capable of handling coke up to 10 tons per hour. Full particulars and drawing if available to No. 9489, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

APPOINTMENTS WANTED

APPOINTMENT required as ENGINEER AND GENERAL MANAGER with Gas Undertaking of repute. Fully qualified Engineer, A.M.I.Mech.E. 20 years' managerial experience.

Those interested kindly communicate with No. 9494, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

APPOINTMENTS VACANT

None of the situations advertised in these columns relates to a man between the ages of 18 and 50 inclusive or a woman between the ages of 18 and 40 inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1945, or the vacancy is for employment excepted from the provisions of that Order.

WANTED.—Fully experienced (*a*) **GAS FITTER,** (*b*) MAIN AND SERVICE LAYER. District Union Rate 1s. 10½d. per hour.

Application, stating Training and Experience, should be sent to the Manager, Gas-Works, Okehampton, Devon.

(Classified Advertisements continued on p. 656)

APPOINTMENTS VACANT (ctd.)

THE WANDSWORTH AND DISTRICT GAS COMPANY

APPLICATIONS are invited from suitably qualified persons to take charge of the HOME SERVICE DEPARTMENT and conduct COOKERY DEMONSTRATIONS.

Applicants must have a good general education, hold a recognized Diploma in Domestic Subjects, and have had previous experience in conducting Lectures and Demonstrations.

The commencing Salary offered is £300 per annum, and the successful candidate will be required to pass a medical examination.

Applications, accompanied by *copies* of not more than two recent Testimonials, should be made to the undersigned not later than November 30, in an envelope endorsed "Home Service."

Fairfield Street, Wandsworth, S.W. 18.
October 26, 1945.

C. M. CROFT,
Director and General Manager.

OLD established gas appliance manufacturers require SENIOR SALES REPRESENTATIVE for the Midlands. Applications in confidence, stating Age, Qualifications and Experience, to No. 9487, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

THE AYR GAS COMPANY, LTD.

APPLICATIONS are invited by the above Company for the position of ASSISTANT ENGINEER AND MANAGER at a Salary of £500 per annum, with the prospect of his becoming successor to the present Manager at an early date, if found suitable by the Board.

Applicants must have first class experience in gas manufacture (vertical retorts), purification and distribution. They must have an engineering training and be capable of carrying out all chemical tests, and have experience in the control of men and capable of taking entire charge. They must also have experience of the administration and financial side of gas undertakings.

All applications to be lodged on or before Saturday, November 10, 1945, with *copies* of three recent Testimonials to the Secretary, Ayr Gas Company, Ltd., Ayr and endorsed Assistant Gas Engineer and Manager.

CANTERBURY GAS AND WATER COMPANY

TECHNICAL ASSISTANT AND CHEMIST

APPLICATIONS are invited for the above position at a commencing Salary of £260 per annum plus War Bonus of £50 per annum.

Candidates must be conversant with all the routine Gas Works Tests and capable of preparing drawings. Experience on Intermittent Vertical Chamber Ovens and/or on the Water side will be an advantage. Applications, stating Age, Experience, together with *copies* of not more than three recent Testimonials and when able to take up duties if successful to be made to the undersigned not later than November 12, 1945.

Gas Works, Castle Street, Canterbury.
October 24, 1945.

R. VEVERS SCOTT, Engineer.

THE CAMBRIDGE UNIVERSITY AND TOWN GAS LIGHT COMPANY

ACCOUNTANT AND ASSISTANT SECRETARY

APPLICATIONS are invited from those possessing suitable qualifications for the post of ACCOUNTANT AND ASSISTANT SECRETARY. Remuneration will be according to experience and ability, but the Company have in mind a commencing salary of the order of £800 per annum, including war bonus. The successful candidate will be required to pass a medical examination and to join the Company's Contributory Superannuation Scheme.

Applicants should be fully qualified accountants, preferably with a secretarial qualification in addition, and have adequate experience in both the accounting and secretarial departments of a public utility company, be capable of designing, introducing and controlling modern systems, and of taking complete charge of these departments and the staff therein under the general direction of the undersigned.

Applications, on a form to be obtained from and returned to the undersigned, not later than Thursday, November 22, 1945.

J. HUNTER RIOCH,
Managing Director and Secretary.

CHIEF ENGINEER.—Firm of Gas Engineering Contractors offer Position of Chief Engineer, to be responsible for D.O. and Technical Departments. Experience in Coal Carbonization Plant, By-Product Recovery Plant and ancillary equipment essential. Good salary will be paid to the right man.

Applications should give full particulars of Training, Qualifications and Experience, state Age and Salary required, and be addressed to No. 9492, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

WANTED.—Draughtsman capable of general plant and works layout. Minimum Salary £300 per annum. Applications, stating Age, Experience and position under National Service and Essential Works Order, by November 15, 1945, endorsed "Draughtsman," to T. W. T. Hammerton, Manager, East Hull Gas Company, St. Mark Street, Hull.

SEVERAL experienced GAS FITTERS required. Union rates of pay. Write, giving Age, Experience and when available, to Engineer and General Manager, Tunbridge Wells Gas Company, 44, High Street, Tunbridge Wells.

SECRETARY wanted for a progressive statutory gas undertaking. Annual sales one thousand million cubic feet. Applicants must be fully experienced, and have an outstanding personality necessary to successfully maintain contacts and conduct negotiations. Apply, stating Age, Training, Qualifications, Salary required and when available, to 9493, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

BOROUGH OF NEWCASTLE-UNDER-LYME

APPOINTMENT OF GAS ENGINEER AND GENERAL MANAGER

APPLICATIONS are invited for this appointment at a Salary of £800 per annum, rising, subject to satisfactory service, by annual increments of £25 to £900 per annum, plus cost of living bonus (at present £59 16s. per annum).

Applicants must be Chartered Members of the Institution of Gas Engineers and must have sound commercial knowledge, together with thorough experience in matters of administration.

The appointment may be terminated by three months' notice by either side and will be subject to the Local Government Superannuation Act, 1937. The selected candidate will be required to pass a medical examination.

Applications, stating Age, Qualifications, present appointment and full details of experience, accompanied by *copies* of not more than three recent Testimonials, must be delivered to me, endorsed "Gas Engineer and General Manager," not later than the first post on November 17, 1945.

Canvassing will be a disqualification.

Town Clerk's Office, Newcastle-under-Lyme, Staffordshire.

J. GRIFFITH, Town Clerk.

LOUTH GASLIGHT COMPANY

APPLICATIONS are invited for the Position of ASSISTANT ENGINEER AND MANAGER at a Salary of £425 per annum, inclusive of War Bonus.

Applicants must have had experience in gas manufacture (horizontal retorts) and distribution. They should have drawing office experience, be capable of carrying out all chemical tests, experience in the control of men, and be capable of taking entire charge, also experience of the administration and financial side of gas undertakings.

Applications, stating Age, Qualifications, present appointment and duties, and full details of experience, to the undersigned, not later than Friday, November 16, 1945.

Thames Street, Louth, Lincs.
October 30, 1945.

D. L. BIRCHMORE, Engineer and Manager.

DRAUGHTSMAN-DESIGNER required for Brass Foundry Laboratory, with technical and practical knowledge of gas thermostatic control and gas cocks and valves. Must have had experience with cooker manufacturer or with gas department laboratory on similar work.

Give details of previous experience and salary required to No. 9495, "GAS JOURNAL," 11, Bolt Court, Fleet Street, E.C. 4.

NEWPORT (MON.) GAS COMPANY

WANTED.—Lady COOKERY DEMONSTRATOR and HOME SERVICE ADVISER. Applicants must be keen, good organizers, fully qualified and experienced. Applications addressed to the General Manager and Secretary of the above Company should state Age, Training, Qualifications, and give particulars of present and former appointments, approximate date available, and be accompanied by *copies* of two recent Testimonials.

Applications from suitable candidates now serving in H.M. Forces or in wartime appointments will receive consideration. Salary according to qualification and experience.

Gas Offices, Mill Street, Newport, Mon.

R. S. SNELLING, General Manager and Secretary.

RUGBY GAS COMPANY

TWO Gas Fitters required, 1st Class City and Guilds Certificate essential. Present rate 2s. 3d. per hour, 47-hour week. Superannuation, Co-partnership. State position with regard to Essential Works Order.

Apply to Engineer and Manager, Gas Offices, Railway Terrace, Rugby.

THE BATH GAS COMPANY

APPLICATIONS are invited for a DISTRICT INSPECTOR. Applicants must have Technical Knowledge and Practical Experience, and be capable of preparing estimates and supervising men. Applications, stating Age, Qualifications, Experience and particulars of present employment, together with *copies* of not more than three Testimonials, should be received by the undersigned not later than Monday, November 26.

18–19, Old Bond Street, Bath.

CHARLES BATEMAN, General Manager.

WANTED.—Experienced Gas Fitters. Standard rates of wages paid. Apply, giving Experience, present position and references, to

Bath Gas Company, 18–19, Old Bond Street, Bath.

CHARLES BATEMAN, General Manager.

GLOSSOP GAS COMPANY

ASSISTANT GAS ENGINEER AND MANAGER

APPLICATIONS are invited from qualified persons, for the Position of ASSISTANT GAS ENGINEER AND MANAGER, at a commencing Salary of £350 per annum, plus a good house in residential area provided rent free. Applications, stating Age, Educational and Professional qualifications, and details of experience, with particular reference to Carbonizing, Chemical Control of Works, and Drawing Office experience, accompanied by *copies* of three recent Testimonials, should be addressed to the Chairman, Glossop Gas Company, Arundel Street, Glossop, to be delivered not later than first post on Saturday, November 24, 1945, endorsed "Application, Assistant Gas Engineer."

Applicants are required to state their position under the Essential Works, and National Service regulations, and a medical examination may also be required.

The Works are equipped with W-D. Vertical Retorts, H. & G. C.W.G. Plant, and Oil type Benzole Plant.

pp. Glossop Gas Company,
W. TOWNEND,
Nov. 7, 1945. Secretary.

CITY OF COVENTRY

(GAS UNDERTAKING)

APPLICATIONS are invited from suitable qualified persons for the following appointments:

SHIFT ENGINEER.

Applicants must have a good general knowledge of modern gas-works practice, including the control and operation of continuous vertical retorts and carburetted water gas plant.

TECHNICAL ASSISTANT—DISTRIBUTION DEPARTMENT.

Applicants must have a thorough technical knowledge and experience of high and low pressure distribution, and be competent draughtsmen capable of preparing drawings and estimates relative to the Distribution Department.

DRAUGHTSMAN.

Applicants must have an all-round experience of gas plant design and structural work, also be capable of taking out quantities and preparing specifications.

The salary for each of the above positions will be Grade S.1 of the Corporation's Salary Scale, which is £350, rising to a maximum of £400 per annum by annual increments of £10, subject to satisfactory service. In addition, a cost of living bonus is in operation which, at present, amounts to £59 16s. per annum.

The successful applicants will be required to pass satisfactorily a medical examination, and to contribute on a statutory basis to the superannuation fund under the Superannuation Acts, as amended in regard to annuities to widows by the Coventry Corporation Act, 1936. They will also be required to contribute to the Staff Widows' and Orphans' Pension Scheme.

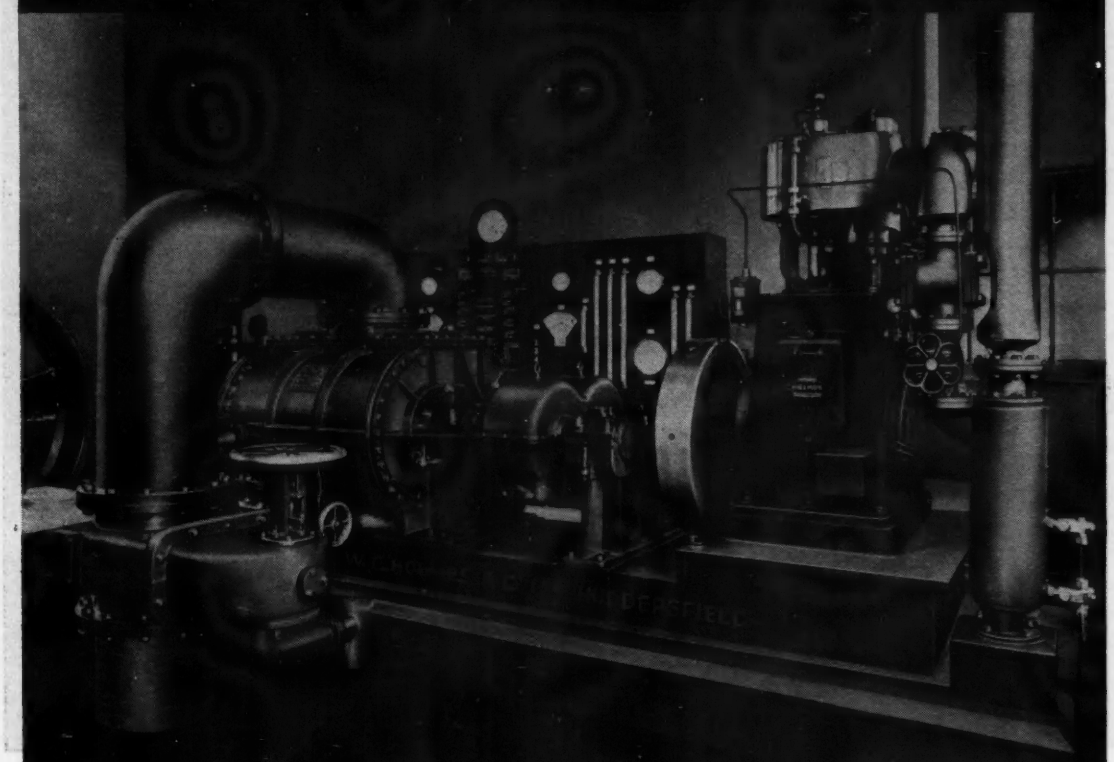
Applications, stating Age, Experience, Qualifications, &c., together with position in relation to the National Service Acts and Essential Works Order and with *copies* of two recent Testimonials, should be addressed to the undersigned so as to be received not later than November 24, 1945.

Gas Department Offices, Hill Street, Coventry.

JOHN E. WAKEFORD, M.B.E., Engineer and Manager.

Get in on the Under Belly of RUST (Engineers' Enemy No.1)
Years of Wear instead of Weeks
GRANT & WEST, LTD.,
'PHONE NORTH 2160
Steel Wires, Ropes & Cables running in and out of Water, Gas, Sulphurous Fumes, etc. will never RUST if treated with
ROPRES
IT KILLS RUST
STAYS on every STRAND.
RUST KILLS ROPES ... but ROPRES rope preservative KILLS RUST.
Use ROPRES
Try a Tin on our Guarantee
3, Furlong Road, London, N.7.
'GRAMS: "SELEKJOINA, HOLWAY, LONDON"

HOLMES · CONNERSVILLE



EXHAUSTERS

The illustration shows a Holmes-Connersville Exhauster installed at a Northern Gas Works—capacity 6 million cubic feet of gas per day.

HOLMES — FOUNDED 1850 — HUDDERSFIELD

Holmes-Connersville Exhausters give long and dependable service and require only a minimum of attention.

HEAD OFFICE · TURNBRIDGE · HUDDERSFIELD

LONDON OFFICE · 119 VICTORIA ST. S.W.1 · MIDLANDS OFFICE 21 BENNETTS HILL BIRMINGHAM 2

Telephones: Huddersfield, 5280 : LONDON, Victoria, 9971 : BIRMINGHAM, Midland, 6830

C230

THE WORKS OF NATURE!

Orchids (Orchidaceae), one of the most numerous and interesting groups of flowering plants, usually beautiful, exceedingly handsome and highly fragrant. Found in moist climates throughout the world, especially in humid tropical forests. They remind us that the gaseous atmosphere inside a Gas Meter is also very humid, occasionally even going below its dewpoint, with consequent deposit of moisture inside the Meter. How important then to specify "Multitest," the scientific diaphragm. No man-made synthetic material can equal this adapted natural product for the heavy task it has to perform.

"Multitest" is made only from the finest *Persian Sheepskin*, in which the resulting tough but pliable leather has been given an oil dressing specially prepared to meet the situation. Each diaphragm passes the most rigid tests before leaving the factory. Besides withstanding moisture, it must be ready for heat or cold, must cope with corrosion, and never break. "Multitest" is available in all sizes to suit every type of meter.

THE METROPOLITAN LEATHER CO. LTD.

Wellington Works, Queen Street, Great Harwood, Lancs.

cm M13

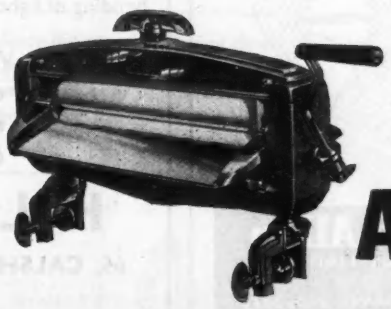
It goes without saying a washing machine fitted with an Acme is good

IT HAS BEEN PROVED by long and sound experience in the past that the Acme Cleanser-Wringer is the foremost of its kind. When a woman in pre-war days talked of a wringer, she *meant* an Acme. When in the coming days of peace she will talk of wringers she will again mean an Acme. To her in the future, as in the past, the Acme will stand as the ideal machine for work in the home laundry. So that when she sees a washing machine fitted with an Acme 55 she will say to herself—"That's a good washing machine".

Your experience tallies with that of the housewife. You know of old the perfect workmanship of the Acme—the points about it which always made it the best cleanser-wringer procurable. The reversible handle, easily used, easily unscrewed and folded back when not in use. The two-way drain, which allows the housewife to drain the flow whichever way she wants it to go. The twin folding boards. The rustless bearings. The way in which perfect results are insured by scientifically applied pressure, which forces out the last clinging particle of soap scum and dirt.

After the war you will be stocking up again with all the good, essential products of a worthwhile peace. Among them washing machines. You know that your customer will look for the sign that a washing machine is good. You will say, "Yes, it's fitted with an Acme". There will be no need for discussion. You and she, partners in experience, know that that *is* the sign. The Acme always was—will be again—the soundest, finest rubber-roller wringer on the market.

ACME WRINGERS LTD · DAVID STREET · GLASGOW · S·E



ACME

FLEXIBLE TUBING

"FULBOR"

TRADE MARK

RUBBER COVERED

MADE IN $\frac{5}{16}$" & $\frac{3}{16}$" SIZES, BLACK FINISH, FITTED N.P. M & F ENDS

ALSO

METAL-LINED RUBBER PUSHONS, M or F ENDS

A. R. WILLMOTT & Co.

REDHILL, SURREY

'Phone : Redhill 98

Patentees and Sole Makers

Modern Industrial Practice

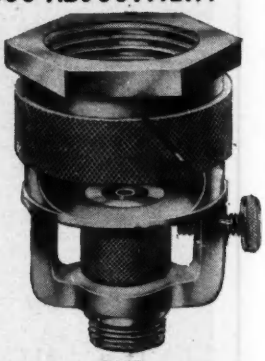
WILKES APPLIANCES

VARIABLE, *low pressure patent*

GAS & AIR INJECTORS

Provide INSTANTANEOUS ADJUSTMENT for subnormal pressures

WILKES patent Gas and Air Injectors solve the problem of varying gas pressures. Made in six sizes for ¼-in. to 2-in. burner connections, the consumption range is 15 to 250 C.F.P.H. In B3005, illustrated, the smaller milled ring controls the gas volume, and the larger (split) milled ring controls the air supply.



B3005

A. H. WILKES & CO.

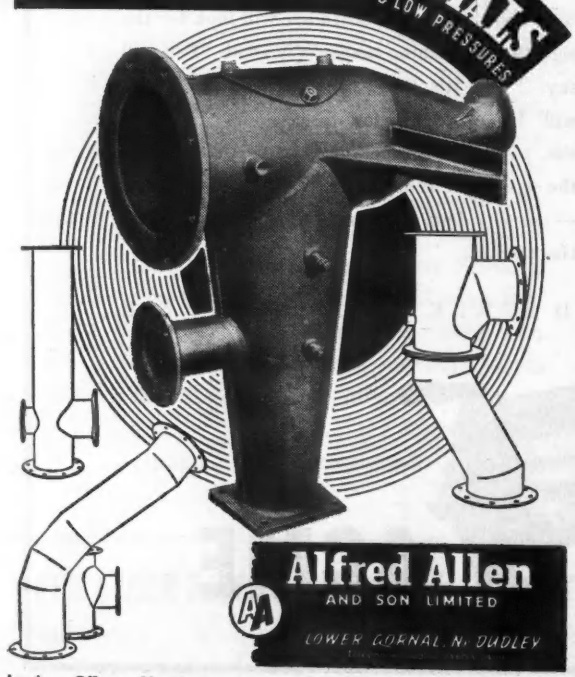
A subsidiary of William Allday & Co., Ltd.

38 G. J. PARADISE STREET, BIRMINGHAM, 1

Telephone: Midland 4804/5/6 Telegrams: Yadall, Birmingham

STEEL PIPES & SPECIALS

WELDED OR RIVETTED FOR MEDIUM & LOW PRESSURES



Alfred Allen

AND SON LIMITED

LOWER GORNAL, Nr. DUDLEY

London Office: 23 Lawrence Lane, E.C.2. Telephone: MONarch 2978

"HILMOR"

TUBE BENDING MACHINERY

This outfit is designed for the bending of lighter gauge tubing

WE CAN SUPPLY MACHINES

- for bending Gas and Steam
- piping from $\frac{3}{8}$ in. to 2 in.
- in the cold state.

HILMOR LTD.

65, CALSHOT STREET, KING'S CROSS, LONDON, N.1.

Phone : Terminus 4714 (2 lines).

How to save GAS

Two practical books for gas users

Probably you have already been able to make a substantial reduction in your gas consumption. You may have decided that no further savings can be made. But are you *sure?*

There may still be sources of gas economy which haven't been thoroughly investigated. To be quite certain about this the best thing to do is to go carefully through the suggestions listed in the two Bulletins below. Examine afresh each economy item to see if it is being followed at your plant to the fullest extent possible.

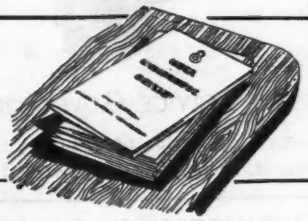
PRACTICAL ECONOMY POINTS FOR INDUSTRIAL GAS USERS
(Bulletin No. 5)

This Bulletin gives two lists of sound and easily followed hints on gas economy : one list is for management, and the other for operators. Planned production coupled with a keen fuel-watching system can produce considerable savings.

OPERATION AND MAINTENANCE OF GAS BURNERS
(Bulletin No. 14)

Every operator of a gas-burning appliance should read and re-read the hints in this Bulletin. Unless he understands the burner and its controls, he may be not only wasting gas and getting bad results, but giving himself a lot of needless trouble into the bargain.

If the recommendations in the Fuel Efficiency Bulletins are followed closely the expectation of gas economies can be based not on hope but on *certainty*. If you need extra copies for your executives or your fuel watchers or your operatives, please write or phone your Regional Office of the Ministry of Fuel and Power.



ISSUED BY THE MINISTRY OF FUEL AND POWER

WILLEY & CO. LTD

GAS METERS
for
INDUSTRIAL ESTABLISHMENTS
made to any capacity required.

EXETER

JEAVONS
GAS
GOVERNORS

HIGH PRESSURE SERVICE GOVERNORS
Inlet Pressures, 1–75 lb. per sq. in.
Outlet Pressures, inches w.g. as specified

JEAVONS ENGINEERING COMPANY
(Props.: E. E. JEAVONS & Co. Ltd.)
TIPTON STAFFS
Grams: "PIPELINES" Phone: TIPTON 1621 (3 lines)

KING Electric CHAIN PULLEY BLOCK

The King Electric Chain Pulley Blocks are built for continuous heavy duty. Three models available—Minor, Major, and Mammoth—ranging in capacity from 5 cwt. and 10 tons.

Write for illustrated booklet on Lifting and Shifting.

GEO. W. KING LTD HITCHIN • HERTS
PHONE HITCHIN 960 (10 LINES)

MANCHESTER CENTRAL 3947 NEWCASTLE 24196 GLASGOW, DOUGLAS 2798–9

DEVELOPMENTS
in Parkerizing and Bonderizing
ARE SIGNIFICANT

Pyrene Metal Surface Treatment Processes made their initial appearance in the nineteen-twenties when Parkerizing was introduced. Since then the following significant advancements have been made:—

1931 "BONDERIZING" for Paint Anchorage.

1935 "PYLUMINIZING" for the protection of Aluminium.

1936 "SPRA-BONDERIZING" for Paint Anchorage by conveyorized and mechanically-controlled production methods.

1937 "D" Process for "PARKERIZING" and "BONDERIZING" of Iron and Steel, also for treatment of Zinc and Cadmium surfaces or mixtures of these with ferrous metal assemblies.

1938 "PYROGRIP" Cold cement for dressing mops and bobs used for scurfing and polishing.

1939 "PARKERIZING" for Lubrication.

1942 "BONDERITE" 'K' for treatment of continuous steel strip and sheet production.

IT CANNOT BE PARKERIZED (Registered) OR BONDERIZED (Registered)

WITHOUT Pyrene CHEMICALS

The Pyrene Company Limited · Metal Finishing Division · Great West Road, Brentford, Middx.

Combined 'Ops'...

means a good finish to any job!

For all users of paint products for preservation, decoration or 'sales appeal' . . . the combined Houses of CLARK-GAY have a specialised material for *your* purpose.

ROBt INGHAM CLARK & CO. *for* ***INDUSTRIAL*** FINISHES

R. GAY & CO. *for* ***DECORATIVE*** MATERIALS——

"A Coating for any surface or purpose!"

ROBt INGHAM CLARK & Co. and R. GAY & Co.
WITLEY COURT, WITLEY, SURREY (WORMLEY 280-4)
and at 6 ARLINGTON ST., LONDON, S.W.1 (REGent 0881)
Associated with:
ROBt INGHAM CLARK & Co. (Scotland) Ltd., BRITANNIA WKS., RENFREW

INFRA-RED
Let us help you with advice on this process

STEEL
STRENGTH SECURITY

Structural Steelwork
for the gas industry

REDPATH BROWN

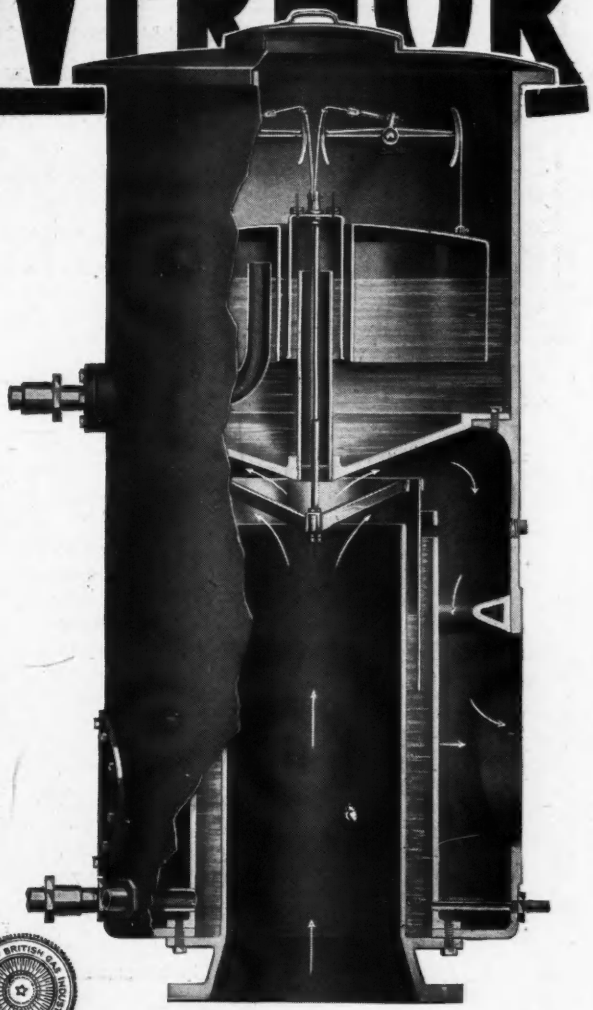
& CO. LTD., LONDON, EDINBURGH, GLASGOW, MANCHESTER, BIRMINGHAM, BRIGHTON, GLOUCESTER, HULL, LEEDS, LIVERPOOL, NEWCASTLE, SHEFFIELD, SOUTHAMPTON, BELFAST. LONDON OFFICE: 26A ALBEMARLE STREET, W.1.
Telephone: REGENT 0345.

Printed by Straker Brothers, Ltd., London, E.C.2, for WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4.—Wednesday, November 7, 1945.

B·K VACUUM GOVERNOR

Patent No. 395,443

SENSITIVE RETORT HOUSE GOVERNING WITHOUT 'RELAY'



- Reduction of inertia in working parts.
- Direction of tar deposition.
- Complete dust-proof enclosure.

BETTER CONTROL OF CALORIFIC VALUE AND CONDITIONS IN RETORTS WITH REDUCTION IN MAINTENANCE COSTS

PLEASE WRITE FOR OUR BROCHURE

W.&B.COWAN

INCORPORATED IN PARKINSON & COWAN (GAS METERS) LTD.

FITZALAN STREET WORKS, KENNINGTGN RD., LONDON, S.E.11; also at GLASGOW, NEWCASTLE-ON-TYNE AND MANCHESTER

THE NAME THAT IMPLIES HIGHEST QUALITY PRODUCTS OF THE TRADE

THE GAS METER COMPANY LTD.

238, KINGSLAND ROAD, LONDON, E.2, and at OLDHAM.

FOUR OAKS

FOR LABOUR-SAVING AND EFFICIENT SPRAYING

These sprayers are both labour-saving and effective in performance. They have proved themselves in many gas undertakings, and gas engineers using them consider they are all that we claim for them. Specialising in spraying apparatus, our wide range of productions includes machines for white-washing, disinfecting, creosoting and paint spraying. Tell us your spraying problem—our long experience can help you.

The "FOUR OAKS" Gold Medal "Bridgwater" Pattern

The special feature of this pump is that the pump bucket works entirely outside the liquid.

18 Gallons, £20 2 6

Other patterns of smaller capacity and lower prices.

Above price plus 10% advance. Owing to the National Emergency all prices are subject to conditions prevailing at the time orders are received.

THE FOUR OAKS SPRAYING MACHINE CO.,
FOUR OAKS WORKS · FOUR OAKS · BIRMINGHAM.

Telegrams: "SPRAYER, FOUR OAKS." *Telephone: FOUR OAKS 305.*

"CARRIED UNANIMOUSLY"
Says Mr. Therm
FOR NEARLY 70 YEARS "WELLINGTON" TUBES AND FITTINGS HAVE ENJOYED THE CONFIDENCE OF THE GAS INDUSTRY
WELLINGTON TUBE WORKS, LTD.
INCLUDING
THE VICTORIA TUBE Co LTD AND EDWARD SMITH LTD.
Head Offices and Works :- GREAT BRIDGE, TIPTON, STAFFORDSHIRE

Printed by Straker Brothers, Ltd., London, E.C.2, for Walter King, Limited, 11, Bolt Court, Fleet Street, London, E.C.4.—Wednesday, November 7, 1945.